From: Whickum, Cheryl
Location: DCRoomARN2528/DC-ARN-OCR-Rooms ((Dial In Numbe Ex. 6 - Personal Privacy
Conference Cod Ex. 6 - Personal Privacy
Importance: Normal
Subject: FW: Meeting with US DOJ by Ms. Helena __ re: Complaint under Title VI of the Civil Rights Act of 1964
Start Date/Time: Wed 9/24/2014 4:00:00 PM
End Date/Time: Wed 9/24/2014 5:00:00 PM

-----Original Appointment-----
From: Whickum, Cheryl
Sent: Monday, September 22, 2014 2:56 PM
To: Whickum, Cheryl; Covington, Jeryl; Golightly-Howell, Velveta; Harper, Nicko; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Wooden-Aguilar, Helena
Cc: Mason, Sheryl
Subject: Meeting with US DOJ by Ms. Helena __ re: Complaint under Title VI of the Civil Rights Act of 1964
When: Wednesday, September 24, 2014 12:00 PM-1:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: DCRoomARN2528/DC-ARN-OCR-Rooms ((Dial In Number Ex. 6 - Personal Privacy Conference Code Ex. 6 - Personal Privacy

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From:	Wooden-Aguilar, Helena
Sent:	Monday, September 22, 2014 10:01 AM
To:	Harper, Nicko; Whickum, Cheryl
Cc:	Packard, Elise; Golightly-Howell, Velveta; Rhodes, Julia; Covington, Jeryl; O'Lone, Mary
Subject:	Fwd: Complaint under Title VI of the Civil Rights Act of 1964
Attachments:	image001.gif

Hi ladies,

OCR needs to schedule a meeting with the US DOJ this week, if possible. I will ask DOJ who we should coordinate but wanted to give you a heads up in case there were days that worked better.

Thanks

Helena Wooden-Aguilar
Assistant Director
External Civil Rights - US EPA
202-564-0792 (office)
Ex. 6 - Personal Privacy
wooden-aguilar.helena@epa.gov

Begin forwarded message:

From: "Wooden-Aguilar, Helena" <Wooden-Aguilar.Helena@epa.gov>
Date: September 18, 2014 at 2:20:14 PM EDT
To: "Neal, Daria (CRT)" <Daria.Neal@usdoj.gov>
Cc: "Golightly-Howell, Velveta" <Golightly-Howell.Velveta@epa.gov>, "Jang, Deeana (CRT)" <Deeana.Jang@usdoj.gov>, "Lareau, Alyssa (CRT)" <Alyssa.Lareau@usdoj.gov>, "Fitzpatrick, Ryan (CRT)" <Ryan.Fitzpatrick2@usdoj.gov>, "Rhodes, Julia" <Rhodes.Julia@epa.gov>, "Packard, Elise" <Packard.Elise@epa.gov>, "O'Lone, Mary" <OLone.Mary@epa.gov>
Subject: Re: Complaint under Title VI of the Civil Rights Act of 1964

Daria

Thanks for your email. I will check calendars and get back to you ASAP.

Helena

Helena Wooden-Aguilar
Assistant Director
External Civil Rights - US EPA
202-564-0792 (office)
Ex. 6 - Personal Privacy
wooden-aguilar.helena@epa.gov

On Sep 18, 2014, at 12:49 PM, "Neal, Daria (CRT)" <Daria.Neal@usdoj.gov> wrote:

Hi Velveta and Helena,

As you know, we received a copy of the CAFOs complaint from Earthjustice.

Ex. 5 - Deliberative Process

Can you let us know some dates over the next two weeks that you are available to meet?

Also, we are missing some parts of the exhibits. If you have the following, can you please email them to us.:

•□□□□□□□ Vol I - Exs 1-26. The pdf stopped at Ex 6, sub-exhibit 11 (We have Ex. 6, the Declaration o[Ex. 6 - Personal Privacy]and sub-exhibits 1-11 of that Declaration but not sub-exhibits 12-17 of that declaration). We are missing Exhibits 7-26 in their entirety.

•□□□□□□□ Ex 39 documents are very blurry. Did you all receive a clear copy?

Thank you so much.

Daria

From: Jocelyn D'Ambrosio [mailto:jdambrosio@earthjustice.org]
Sent: Wednesday, September 03, 2014 6:39 PM
To: 'mccarthy.gina@epa.gov'; 'Title_VI_Complaints@epa.gov'
Cc: 'wooden-aguilar.helena@epa.gov'; 'Tejada.matthew@epa.gov'; 'McTeertoney.heather@Epa.gov'; 'Halim-Chestnut.naima@Epa.gov'; Neal, Daria (CRT); 'tom.reeder@ncdenr.gov'; 'christine.lawson@ncdenr.gov'; [Ex. 6 - Personal Privacy] 'lbaldwin@waterkeeper.org'
Subject: Complaint under Title VI of the Civil Rights Act of 1964

Dear Administrator McCarthy and Ms. Golightly-Howell,

On March 7, 2014, the North Carolina Department of Environment and Natural Resources ("DENR") issued a general permit that allows industrial swine facilities in North Carolina to operate with grossly inadequate and outdated systems of controlling animal waste and little provision for government oversight, which has an unjustified disproportionate impact on the basis of race and national origin

against African Americans, Latinos, and Native Americans in violation of Title VI of the Civil Rights Act of 1964 and EPA's implementing regulations.

North Carolina Environmental Justice Network, Rural Empowerment Association for Community Help, and Waterkeeper Alliance, Inc. ("Complainants") hereby submit the attached complaint against DENR and request that EPA investigate the complaint and require that DENR come into compliance with the law.

As you may know, Complainants and other community members in eastern North Carolina have complained to DENR about the adverse effects of the swine industry on their health and environment for years, to no avail. Today, Complainants ask that EPA take action.

We will be forwarding exhibits by separate email and, also, sending hard copies overnight by Federal Express to each of your offices. Of course, please let us know if these materials raise any question. We would welcome the opportunity to discuss the complaint.

Sincerely,

Jocelyn D'Ambrosio and Marianne Engelman Lado

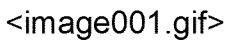
Jocelyn D'Ambrosio

Associate Attorney

Earthjustice Northeast Office

48 Wall Street, 19th Floor

New York, New York 10005
T: 212-845-7385
F: 212-918-1556
earthjustice.org



EPA

Moderator: Jonathan Stein
May 12, 2016
11:05 a .m. ET

Operator: This is Conference Ex. 6 - Personal Privacy
Conference record has joined the conference.
Ericka Farrell: Hello?
Jill Johnston: Hello. This is Jill Johnston.
Mary O'Lone: Hi Dr. Johnston. Is Marianne on the line yet?
Marianne Engelman Lado: OK, you know what? We were mute. My apologies. So this is Marianne Engelman Lado from Earthjustice and I'm here with three colleagues and I'll let them introduce themselves.
Alexis Andiman: This is Alexis Andiman, also Earthjustice.
Brent Ducharme: Brent Ducharme from the UNC Center for Civil Rights.
Elizabeth Haddix: And Elizabeth Haddix, also from the Center for Civil Rights.
Marianne Engelman Lado: Hi there. Who's there at EPA?
Ericka Farrell: OK. We got Ericka Farrell from OCR, Title VI Office.
Jeryl Covington: Jeryl Covington from OCR Title, VI Office.
Mary O'Lone: This is Mary O'Lone. I'm from the Office of General Counsel.
Johanna Johnson: Hi. This is Johanna Johnson also from the Officer of General Counsel.
Marianne Engelman Lado: Hi there. Thank you.
Ericka Farrell: OK. Good afternoon. Again, this is Ericka Farrell from the Office of Civil Rights, Environmental Protection Agency in Washington, D.C. and thank you for taking the time to talk with us. And please be aware that this interview of Dr. Jill Johnston is being recorded. And, are there any objections to recording this interview?
Jill Johnston: No.
Marianne Engelman Lado: Dr. Johnston, do you have any objections?
Jill Johnston: No I guess.
Ericka Farrell: OK. Thank you. And, as you know, your August 2014 study was submitted to OCR to rely upon in this investigation and so whether North Carolina Department of Environmental Quality Regulations of swine feeding operations discriminate against African-Americans, Latinos, and Native Americans on the basis of race and national origin in neighboring counties and violation of Title VI and EPA's implementing regulations. And today we plan to ask some – ask you some fundamental question. I'm sorry, foundational questions, regarding the study in order for the OCR to determine whether we can rely on this study for our investigation. And in doing so, we are trying to understand what issues and arguments may be raised in opposition to your study. And we may need to ask you further questions at a later date. And as we get started, we're going to start right now, Dr. Johnston with just some basic

background questions. And can you please state for the record your name.
Marianne Engelman Lado: I'm sorry. Ericka – Ericka, if I can just interrupt you for a second. I just want to make sure, there were two studies that Dr. Wing and Dr. Johnston did conducted and then we submitted. One was the 2014 which you mentioned and the other was the revised version that's dated that it was exhibit 12 to a submission earlier this year. And it was dated October 19th, 2015 and it's based on that current set of hog facilities that are under the general permit. I just want to make sure both are in front of you.
Mary O'Lone: Well Marianne, the other one is not. The second only update. That's going to be one of our question. I'm sorry. This is Mary O'Lone. That was going to be one of our questions. Jeryl is now looking to see if we have it in our record.
Jeryl Covington: Right. As if Exhibit 12, that's the declaration by Ex. 6 - Personal Privacy
Mary O'Lone: No. She sent on something –
Marianne Engelman Lado: So Jeryl, is not Exhibit 12 to the complaint. It's attachment 12 to a subsequent submission that we made in 2016 that contains Steve Wing's declaration and it contains the revision of the study.
Mary O'Lone: What's the date of that because they're shaking – this is Mary again, their shaking their heads like OCR doesn't have it.
Marianne Engelman Lado: April 12th, you did received it. I'm certain of that. April 12, 2016. And it had – and this is attachment 12. And it's important, you know, we'll get into the methodologies and all that. But you know, we wanted to make sure that there was a study of the actual data under the new permit. And this revised study is based on that, the data under the new permit.
Mary O'Lone: OK.
Marianne Engelman Lado: And we should go ahead even if you can't find it, you can ask questions based on the first study and we can resume at another time. That will still be helpful I'm sure. But it's important that you have that second study.
Mary O'Lone: Are you, Marianne – this is Mary again, are you at your desk? I mean can your e-mail it to Jeryl?
Marianne Engelman Lado: Yes.
Mary O'Lone: E-mail it to all of us so that at least we know we have it. They'll go back and look for it. But I just want to make sure that we do get it today. But I also agree with you. Because I think unless the methodology changed from the report submitted with the complaint to today, the questions would be the same. It's just a matter of the conclusions or results, right? That's what would have changed potentially.
Marianne Engelman Lado: That's right. I mean, I'll let Dr. Johnston speak and she'll answer specific questions about that. But the basic methodology is the same – there was – there may have been some tweaks that when you focused on it, she can answer questions about. So Alexis is forwarding it and – who's – so who's going to – if they look for an e-mail who would it be from?
Alexis Andiman: Is there just one e-mail I can send it to you and I'll just forward it to you right now.
Marianne Engelman Lado: Who should we send that for?
Mary O'Lone: Covington.jeryl.
Marianne Engelman Lado: OK. Got that.
Mary O'Lone: @epa.gov.
Jeryl Covington: We do not – yes, we do not received that. I don't have a copy of that.

Mary O'Lone: Okay. So back to the beginning.
Ericka Farrell: Yes. For the record, Dr. Johnston, can you please provide your full name?
Jill Johnston: Jill Elizabeth Johnston.
Ericka Farrell: And please provider your professional contact information, specifically your office address and office telephone number and office e-mail.
Jill Johnston: Yes. It's 2001 North Soto Street, Los Angeles, California 90089. My office phone number is 323-442-1099 and my e-mail is jillj@usc.edu.
Ericka Farrell: Thank you. And as we begin, can you also state what your current professional position is?
Jill Johnston: An Assistant Professor of Preventive Medicine in the Division of Environmental Health at the University of Southern California.
Ericka Farrell: OK. And as we begin, also, can you give us what your professional background is in relation to the studies that we're going to be talking about today.
Jill Johnston: Yes. I have a PhD in Environmental Science and Engineering with the minor in public policy from the University of North Carolina at Chapel Hill and also completed a Post-Doctoral Fellowship in Environmental Epidemiology also at UNC.
Ericka Farrell: OK. And now, I'm going to turn this over to Mary O'Lone.
Mary O'Lone: So this is Mary O'Lone. Dr. Johnston, Marianne's probably explained to you one of the reasons that we wanted to speak with you. And after we go through the questions that we have, you can see why it was very good idea for us to speak to you first. Because what we wanted to do when Marianne explained that Ex. 6 - Personal Privacy and that you know, if we had a chance to speak with him in the future, we wanted to try to limit the questions that you know, we would be asking him. So, we really appreciate you taking yourself available to answer these questions with us. Because I think, there are a lot of them and a lot it comes from the fact that we don't have a particular background on this. So, we're going to ask you probably some very basic questions from your perspective.
Jill Johnston: OK.
Mary O'Lone: But the first one is your role in the – we're going to talk first about the 2014 study. And your role in that study.
Jill Johnston: Yes, so I collected the data and conducted the analysis in consultation with Dr. Wing and created that the table and the figures in this report and help with drafting the text. But Dr. Wing took the lead on writing the text for this.
Mary O'Lone: OK. Was this study peer reviewed or did it go through any kind of even informal internal sort of peer review?
Jill Johnston: There was discussion with other faculty within our department at University of North Carolina but it was not submitted or considered under scientific peer review process for a journal.
Mary O'Lone: OK. And we might as well ask the update that was done. Is it similar?
Jill Johnston: Yes, (inaudible) it was probably not submitted or have been under a scientific peer review.
Mary O'Lone: OK. Do you – and Marianne I don't know if this is – this is may be a question for you. I don't know if it's for you or Dr. Johnston, but was the – was the 2014 study submitted to North Carolina DEQ?
Jill Johnston: No.
Mary O'Lone: OK. Or do you know if they're aware of it?
Jill Johnston: Not to my knowledge.

Mary O'Lone: OK. All right. Now we're going to get into sort of a knots and bolts of the questions that we had about the study itself. So, Dr. Johnston, do you know – can you explain why three miles was chosen as the distance?
Jill Johnston: Yes, so we based that on a few (inaudible) peer reviewed scientific studies. One is by Mirabelli from 2006 that specifically looked at asthma prevalent in middle school students in North Carolina and found that middle schools within a three mile radius of an industrial hog operation had higher prevalence of asthma, and other asthma related symptoms, compared to students who went to school further away. Also some dispersion modeling of hydrogen sulfide conducted of at a large hog CAFO in Iowa show that hydrogen sulfide can travel up to 6 kilometers which is a little over three miles from the facility itself and impact air quality in that radius. And there was also sort of two other studies that looked at, the relationship between hydrogen sulfide protections and hog CAFOs one from North Carolina and one from Iowa. The one from North Carolina being by Guidry in 2016 and then by Pavilonis in 2013 that used 5 kilometers as their distance.
Mary O'Lone: OK. Thanks. Did you by any chance look at other distances or analyze other distances that weren't discussed in the 2014 report?
Jill Johnston: So we did not. We considered different criteria for inclusion of census blocks, you know, whether any part was within three miles or whether they're centroid. But we didn't have a capacity to compare our three mile results to two miles or one mile or some other criteria.
Mary O'Lone: OK. How was –the basic question, how was the block centroid determined? Was it geographic, location or?
Jill Johnston: Yes. So (inaudible) our GIS software with you know, the census block data from the U.S. and to 2010. And then, yes, the program assigned the centroid.
Mary O'Lone: So it assigned that based on the geographic center of the block not something to do with the population.
Jill Johnston: It had nothing to do with population, yes. It had to do with what the spatial definition of where the centroid would be based on the shape of the block.
Mary O'Lone: OK. For the study area, 19 counties were excluded that didn't have an IHO and didn't border one. Why was it important to exclude those 19?
Jill Johnston: We thought it appropriate to consider population that were potentially at risk for being near an industrial hog operation. And so, just the geography and mountainous nature of Western North Carolina, you know, as well as highly urbanized areas. Or just not locations where CAFOs would be sited. So we didn't consider those population at risk and that did not include them in the study area for this analysis.
Jeryl Covington: Yes. This is Jeryl Covington. I do have one question on that one. You all were also excluding the counties that were adjacent to and had no – please give – can you explain the basis for that exclusion as well to the 19 counties in the Western North Carolina area.
Jill Johnston: So we excluded counties where they had to meet two criteria. One is they had no CAFOs in their borders and no adjacent county for them had any CAFO. And it's largely because these areas are highly mountainous and don't have the facilities or the land mass that you need for the liquid waste distribution system for a CAFO to be permitted there.
Mary O'Lone: Ok?
Jeryl Covington: OK.
Mary O'Lone: This is Mary again. What is the – can you explain the adjustment for rurality and is that the same thing as adjusting for population density. And then why was that appropriate?

Jill Johnston: Yes. So – yes. The – so the content of rurality we measured it by population density for each census block. And we find this – and so we present both the unadjusted and the adjusted values in the report. But find that this is important because the land availability and also typically the price of land is highly influence by the population density in the amount of land that is available. And also different patterns of which racial or ethnic group within which areas can be – can influence population density as well. So that's why we – we chose that content of both the marker of kind of the economics and the land availability to adjust for in the model.
Jeryl Covington: This is Jeryl again, could you – could you clarify the land availability. I wasn't quite clear on that explanation.
Jill Johnston: OK. Yes, so, I mean. As I mentioned before, not only do you need the barns to house the animals but then also you know, fields around it where the waste is sprayed. So an area with the high population density, you're not going to have – it's not necessarily going to be appropriate to have the space availability to put a CAFO in those areas or to put as many. And – it's basically, the land available for agriculture can basically correlated with the population density of that area.
Mary O'Lone: But that was – OK. This is Mary again. Because I – you can't see me but my brain is cranking very slowly. But, so this is not because you were excluding these areas because you've already excluded the 19 counties that have nothing. Now you're doing an adjustment to say, to basically say that OK, in the – to find that the… the more sparsely populated – maybe we'll get into when we get back into the table in explaining those. But I'm trying to understand the fundamental points of why you did it. And it is to say that these things tend to go in really rural areas. And you know, as we look at areas they get more and more rural, we also see, you know, where they are, the amounts of hogs there are and a change in the demographics. That's why you're doing the rurality piece to it?
Jill Johnston: Yes. And it's sort of a concept of, I guess they're familiar with confounding and other epidemiological models. So we felt that population density is a very important factor that influences the siting of hog CAFOs. And so, that's why we presented sort of adjusted models to acknowledge the fact that population density as sort of a proxy for both the cost of land and the sort of amount of land that would be available for either agricultural activity was important to consider when we're looking at the association between race and permitting of hog CAFOs.
Marianne Engelman Lado: This is Marianne. Can I jump in for a sec. On page 4 of the 2014 reports, Dr. Johnston, you have –there's a sentence there that says, by adjusting for populations density or rurality, we compare racial vulnerability that IHOs for racial groups within each level of rurality –
Jill Johnston: Right.
Marianne Engelman Lado: I think that's what you're getting at. Can you explain that a little bit more that is – so it's not taking away the salience of race but testing for it by looking within each level of rura…, I can't even say the word, rurality. Is there still salience of race towards this outcome? Is that right?
Jill Johnston: That is correct and we try to provide an example here that perhaps is a little bit more intuitive. But for example, like when you're looking at mortality rates and you want to compare across two different populations. It's important to account for age because of risk of mortality changes with different age groups. And so if the age structure of the two populations aren't equal, you want to address for those factors or account for those factors so that you can look within each age group. So essentially, we're trying to account for the same thing here that

acknowledges that perhaps your risk for a CAFO being permitted nearby you is different depending on the population density of the area where you live. And so by including that adjustment, we can account for those differences across different areas in North Carolina.
Mary O'Lone: OK. Is everybody good on that right now? OK. OK. Can you explain the study state live weight calculation? So we're on page 4 again of the 2014 study. And how did you determine whether the study state live weight of an IHO should be included and I – this is – it's not about the calculation of the city state live weight but more – how you captured a particular IHO. And I sort to have two visual images in my mind. And one has – you take the centroid of a block and you draw a circle three miles out, right?
Jill Johnston: OK.
Mary O'Lone: This is what I'm thinking happened. And the latitude and longitude of any IHO that fell within that three mile circle is what you counted. Is that right?
Jill Johnston: That is correct. And it was some, but yes. We started the centroid of each block. And did exactly what you describe.
Mary O'Lone: Because, well we were trying to figure out whether there was anything – whether it was like if you had, instead you were pulling, if there were a block that straddled the three mile circle, you know, you would pull an IHO that might be sitting in that block. Do you know what I mean? But that's not what you did. You just – it was if the latitude and longitude of that CAFO fit in the circle. Then it was added to the total weight.
Jill Johnston: Yes. So in essence, each CAFO was not counted one time. It could be counted multiple times depending on how many blocks it was within three miles from.
Marianne Engelman Lado: In other words, this is Marianne Engelman Lado again, Dr. Johnston, if there was a CAFO that straddled that three mile radius or was in one radius and then another radius, how would you handle it?
Jill Johnston: Yes. So our unit of analysis is the census block. And so for each census block sort of independent of all the other ones, we would draw the three mile radius and count up every CAFO that fell within the three miles. And then we would go to the next, you know, the adjacent block to it. Draw a circle and count up every CAFO within three miles of that block. And so, so the sum of the steady state live weight, could be counted, you know, if not, we didn't assign each CAFO only to one block. We assigned each block to the nearby CAFOs. Does that help explain it?
Marianne Engelman Lado: I think so.
Mary O'Lone: Well, so then the next, I guess my next question is when you look at the people. So the latitude and longitude has to be within third, three mile circle. And then when you count the people, how are you doing that?
Jill Johnston: So the people aren't counted more than once. We, we include the population of each census block. So, all the – there's a hundred people living in the census block, they're all assigned the same study state live weight based on what the three mile radius.
Mary O'Lone: OK. OK.
Jill Johnston: So people are not counted more than once in the model.
Mary O'Lone: OK. I get it. Anybody else have any question about study state live weight? All right. OK, the next question was about you know, asking you about the update. Did the update happen but we know that it did. So, we will skip that one and come back to it at a later date probably.
Jill Johnston: OK.
Mary O'Lone: So on page 4, you describe how race and ethnicity was categorized. But then

when we looked at the complaint, we went – and we looked at page – where is that? 106. 106. OK, on page – I don't know what – 35 of the complaint. It also talks about the characterization in particular of African-Americans. And the description seemed, seemed inconsistent to us. And it had to do with people who could identify themselves as black and Hispanic. And so, we were wondering if, if these two – if the statement about it on page 4 of the 2014 report and footnote 106 on page 35 of the complaint, whether they were inconsistent or weren't inconsistent or you know, like how we should be interpreting this.
Jill Johnston: I mean, so I can describe the definition we used in the report and then maybe Marianne can talk about the footnote. But we used for of one the census categories. And so, our definition of block was anyone who identified it – identified themselves as African-Americans are black with or without any other race or ethnicity. So if they identified as black and Hispanic, it would be categorized in this black group. So that's how we did it for the purposes of this –
Mary O'Lone: Ok.
Marianne Engelman Lado: I'm sorry Dr. Johnston in – on page four it says black is people who identify themselves as African American or Black with or without any other race. Is that right? I thought just heard only without – with.
Jill Johnston: Yes.
Marianne Engelman Lado: I'm sorry without.
Jill Johnston: No, I'm sorry if I said that I misstated. No, I meant – yes, how it's written here is correct. So it's –
Marianne Engelman Lado: And then footnote 106 says the term African American herein corresponds black as used in the report it – the black racial category referred to those who identified as African American – that's probably a typo. It should be with or without.
Mary O'Lone: OK, all right.
Johanna Johnson: Hi this is Johanna Johnson. I just one quick follow up question. And that's with regards to individuals who identify themselves as Black Hispanic. You indicated they will be categorized in the black category. But would they also appear in the Hispanic category as well?
Jill Johnston: Yes, So I would note one of the (inaudible) these terms but the definitions of Black, Hispanic and America Indian. We do not use mutually exclusive terms or mutually exclusive categories. So people when we do the race specific analyses they could be counted with more than one race based on what they identified on their census forms.
Mary O'Lone: OK, any other –
Jill Johnston: But the category of non-Hispanic white and people of color. Those two are mutually exclusive. So there's no one that overlap, you know, which is what we use for our primary analysis.
Mary O'Lone: Right. Anything else?
Johanna Johnson: No.
Mary O'Lone: OK. Now what we'd like to do and Marianne maybe you can help in the updates that was sent. You know is it just the numbers that have changed? Well let me explain what I'm going to do here. What we wanted to do was walk through in a study. Each of the tables – each of the figures and tables to make sure we understand what they say and then
we wanted to look at them – look at how they're characterized in the complaint because one of the things that we have to do as we discussed it internally is be able to communicate in layman's terms how these – what these findings are. So we want to make sure that we

understand it and we can see that, you know, the complaint takes, you know, writes up something. And so we wanted to see – we wanted to make sure that, you know, what was in the study or I mean what was within the complaint could, you know, use that as our layman's discussions. So we wanted to cross walk these things but also go through them and make sure that we actually understand, you know, what the study itself is saying. OK?
Marianne Engelman Lado: Yes, let me give some context and I don't know if this will be helpful or not but let's try. First of all Elizabeth reminded me and we will double check. When we filled the complaint we probably sent a copy to then DENR now DEQ.
Unknown Female Speaker: I think that's right.
Marianne Engelman Lado: There were some confidential documents in there. So we didn't send the whole thing. And we'll have to go back and check our records and let you know what we sent and what we didn't. I don't see any reason – I mean this was not a confidential document. But I just don't remember. So and I'm not sitting in front of the, you know, my computer where I can pull up exactly what was sent to DEQ. So, so we'll do that and we'll get back to you on that. In terms of the difference let me tell you our thinking and methodology as complainants. And then Dr. Johnston can say a little bit about what might have been different, if you remember Dr. Johnston. So we obviously wanted to get, even though the 180 day requirement is waivable we wanted to get a complete set of allegations into OCR within 180 days. So we wanted to do it–submit a disproportionality analysis that was rigorous within that 180 day timeline. The challenge is at the 180 day timeline, the data – I think it wasn't even up on the Website for DEQ then DENR. But if it was, not with sufficient notice to be able to ask Dr. Wing and Dr. Johnston to do an analysis. So talking to – knowing that there wasn't going to be that much difference in the location of these facilities for technical reasons which you may be aware of that any new facility in the State of North Carolina have to use new technologies. And it's only pre-existing facilities that haven't expanded that are under the state the general permit. So while some facilities may drop out of the list there are not going to be any new facilities on the list. And there's kind of disincentive to drop out. So we knew there wouldn't be that much change. So we did ask Dr. Wing and Dr. Johnston if it made sense to do the disparities analysis first on the list that existed at the time right before we filed the complaint which is what they did with the – and then and they could refine their methodology by doing tha,t building on the work that they had previously done on disproportionality.
And then once – once we had the list and I should say and Dr. Johnston you can talk more about this, there was a lot of work that went into that. There was a lot of clean up of the data. The – the geographic locations often weren't right. There was just a lot of work that went into working with that list. And then they were able to provide the 2014 disproportionality analysis. But with the full intent that once we had the – the list of facilities that had been approved for operation under the challenge firm and are under the new permit they would then conduct the same analysis.
But I say the same kind of in quotes because if there were any – any lessons learned or any tweaks that the new data provided that they would – they were free to kind of have the best analysis possible. So, you know, again Dr. Johnston can refresh my memory to precisely what tweaks there may have been. But I don't want to state that the only difference is in the results because there was an opportunity to have a fresh look at the methodology – fundamentally the methodology was similar. But they were able to tweak the way they were doing things in order to do the best study possible.
Jill Johnston: Yes, so the major difference is there were 2,055 CAFOs included in the 2014

analysis. And then for the updated analysis based on the permit list there were 2,029. So, you know, that was the major change for facilities that do not undergo permitting or ones that where their permit expired and we do have any evidence that they were going to like renew their permit. What we tried to do in the 2014 analysis was use the best available knowledge we had about which – which CAFOs to include. So we did get some additional information from the state about which ones were not operational and which ones may have had permits but had zero animals housed there. So we did make some adjustment in this first paper to try to anticipate what would be included under the general permits. But in terms of the methodology the analysis and the tables provided are the same. We changed the figures a little bit to try to make them look nicer and we also – there were 20 western counties excluded and that was using the same criteria as we did before. But there was just one additional county that met these criteria.
Mary O'Lone: OK. Yes, OK. Well that was a good explanation. So can we now turn to the – we're going to work from the 2014 (inaudible) you know what we have in front of us. And maybe when you made the changes some of our questions will be answered. But I just – I wanted to start on page 11 just with figure 1. And I have no questions about that. Now I'm moving on to figure 2.
Jill Johnston: OK.
Mary O'Lone: OK. It says the percent of population living within three miles of an IHO in relation to the percent of people of color. Is that the percent of the population in the green study area or the –
Jill Johnston: Yes, so all of the data and all the table and figures provided here are from the study area.
Mary O'Lone: So figure 3. So in the complaint figure 3 is described on page 35 in paragraph 133. I should (inaudible). And I guess the – what we're asking you Dr. Johnston is well I guess do you agree with, that this statements states what your study shows and what that figure shows I guess?
Jill Johnston: Can you read the statement please?
Mary O'Lone: You don't have it? I'm sorry.
Jill Johnston: No, I don't have it, sorry.
Mary O'Lone: It says as shown in the following figure which depicts the relationship of industrial swine facilities to the racial and ethnic composition of North Carolina, swine facilities are clustered in communities of color.
Jill Johnston: Yes, I would agree with that statement.
Mary O'Lone: OK – flipping.
Jill Johnston: And now just to note this becomes figure 2 actually in the updated report. And here we kind of just have three categories of people of color. Anyway it's displayed more closely than how we conduct the analysis in the updated report.
Mary O'Lone: What do you mean? I'm not sure I understand what you mean.
Jill Johnston: (inaudible) – so we actually had like six – six categories that we assign census blocks into six racial categories. And on this map but as original figure in order to simplify it we just show three categories under 20 percent, 20 to 40 percent and then above 40 percent.
Mary O'Lone: We – that was actually a little hard to hear. Can you say that again?

Jill Johnston: I'm sorry. So on this figure, the figure 3 we show – we just showed three categories just that we simplify for purposes of displaying the information which was less than 20 percent, 20 to 40 percent and greater than 40 percent whereas in the updated figure we show

all six categories that we use for our analysis. So it's just a minor point and it doesn't impact my interpretation of it.
Mary O'Lone: OK.
Jill Johnston: But just to note if were discussing these changes between the two versions. That was one. We just changed how we displayed the information.
Unknown Female Voice: OK. In the updated version it's figure 2 on page 11.
Jill Johnston: Yes.
Mary O'Lone: OK. So now we're moving on to table 2. So table 2 is – table 2 is discussed in a handful of paragraphs in the complaint. So I guess I will just read them to you one at a time. So this is paragraph 132 on page – I don't know what – wait, 13, so it's 13. No. It's not. What am I talking about? 35, paragraph 132 on page 35 of the complaint. And we are talking about table 2 on page 13 of the study. Paragraph 132 says analysis of the population statewide yields consistent result. The proportions of African Americans, Latino's and Native Americans statewide living within three miles of an industrial swine facility are 1.4, 1.26 and 2.3 times higher than the percentage of non-Hispanic Whites respectively which-Table 2- the disparities are also statistically significant. Is that right?
Unknown Female Voice: Yes.
Mary O'Lone: Table 2.
Unknown Female Voice: I would note that refers to both page 6 and table 2 of the report.
Mary O'Lone: What?
Unknown Female Voice: Paragraph 32, 132.
Unknown Female Voice: OK.
Mary O'Lone: That is basically your sort of quoting page 6. Is that what you're saying?
Unknown Female Voice: I believe so.
Jill Johnston: So that statement I think maybe actually doesn't draw on table 2 that we have shown here which is just for the study area. I think – I believe those numbers that you've read are for the whole state for a statewide analysis where we don't exclude any areas.
Mary O'Lone: OK. So which table should this or is this about? Where are those results displayed?
Unknown Female Voice: It's the first paragraph on page 6, OK.
Jill Johnston: I am not sure of all the tables from our statewide analysis were included in the documents sent to you.
Mary O'Lone: You mean – OK. So the document dated August 29th, 2014, Industrial Hog Operations in North Carolina, what you're saying is there's results discussed in the text that aren't displayed in the table or a figure.
Jill Johnston: Yes, so all the tables and the figures provided in this document are just for the analysis where we restricted it to the study area as (inaudible) –
Mary O'Lone: OK.
Jill Johnston: But there was a parallel analysis that didn't restrict that like included all census blocks in the State of North Carolina and so these results included in the text on page 6 are from that analysis that uses the entire population.
Unknown Female Voice: OK. OK. Just to draw your attention to paragraphs 131 and 132 of the complaint. 131 says analysis based on the study area that excludes the state five major cities in western counties. And then goes on to give the numbers. And then paragraph 132 by contrast says analysis of the population statewide yields consistent result.
So paragraph131 is about the data in the study area and paragraph 132 says it's consistent but

here are the numbers for the state – for a statewide run. Is that correct Jill?
Jill Johnston: Yes.
Jeryl Covington: So 131 again is just for the state –
Jill Johnston: OK.
Jeryl Covington: Or Statewide?
Unknown Female Voice: Paragraph 131 says analysis on a study area so it's for the state but only the study area within the state. And that's what the tables reflect. Paragraph 132, the very first sentence says analysis of the population statewide yields consistent results. So that's – those numbers 1.4, 1.26 and 2.39, which are the same numbers that appear at the top of the report on page 6 first paragraph, is the statewide numbers not just the study area.
Mary O'Lone: So the reference to table 2 is not because those numbers come from table 2. But because table 2 – wait. What is it? It's not about…
Unknown Female Voice: I think the reference to table 2 should probably be like see also. It's – you know I think table, I'm sorry, Page 6 is the actual support whereas table 2 – as Dr. Johnston said seems to be only the study area. Is it all state in the original?
Unknown Female Voice: Well it's racial and ethnic composition of (inaudible) census blocks within three miles of an IHO and more than three miles. So it's the study area excluding the western counties.
Unknown Female Voice: (inaudible) western counties.
Unknown Female Voice: Let me (inaudible) –
Mary O'Lone: OK, so I'm sorry. So this paragraph is basically saying that the statewide results are consistent with table – the proportions are consistent with table 2 which is about the study area?
Unknown Female Voice: Right.
Mary O'Lone: Dr. Johnston is that right?
Jill Johnston: Yes, I'm just, Ok, I'm looking, so yes, I opened up the – I found the document. So yes, so 131 is the proportion, matches within table 2 and then 132 is referring to the state wide analysis with no exclusion areas in which that we did not show the table in this report.
Mary O'Lone: OK, great. We're going to go to – I think so paragraph 140 in the complaint I think it's sort of repeat of that. The statewide proportion of African Americans living within three miles of an industrial swine facility – statewide is 1.4 times higher than the proportion of non-Hispanic whites in that site, table 2 and page – table 2 and page 6.
Jill Johnston: Yes, I believe that's the – that's the same pattern where the one above matches that, the table. In this report, that is the study area, and then 140 versus the statewide analysis.
Mary O'Lone: OK, 142. OK, so the next paragraph then is 142. Are we having the same issue here – the same thing going on? African Americans make up a larger portion – proportion of the population living in proximity to industrial swine (inaudible) than the proportion of the population living within three miles away from any facility with disparity.
Jill Johnston: I believe that (inaudible) compares right that the 20 percent of African American compared to 13 percent of non-Hispanic whites that live within three miles of a CAFO.
Unknown Female Voice: I'm sorry were you quoting again from paragraph 132?
Unknown Female Voice: What are you talking about 142?
Unknown Female Voice: 142, OK, thank you.
Jill Johnston: (inaudible). And it doesn't provide the numbers. But I believe the reference seems appropriate.
Mary O'Lone: OK. And the statement is accurate? 142, OK. Now were moving to 148.

Jill Johnston: Yes, that's the same. That's in reference to the statewide analysis.
Mary O'Lone: OK and that's accurate?
Jill Johnston: Yes.
Mary O'Lone: And 150. (inaudible)
Jill Johnston: Yes, I believe that is correct.
Marianne Engelman Lado: OK. So I'm just trying to reach back and – and Dr. Johnston you may remember as well, these reference to table 2, there are different ways of looking at them. And one maybe that we met kind of the report six provides the information, it's more like a see also table 2 with consistent results. But – but the other way of thinking and I remember that there were lots of charts and tables with the numbers. And I think, and again Dr. Johnston you may remember better than I, we may have taken some charts and tables out simply to make it all more presentable because it was kind of too long and too much. And if we did, could this table 2 have referred to statewide analysis? I just don't remember if there was an earlier draft with more tables, but I seem to have some vague recollection and if so that it may just be kind of typo. But again it's also perfectly consistent, you know, that we may have just thought it's also supported by table 2.
Jill Johnston: You are correct that some variation of all these tables included everything from the study area analysis and then a repeat, you know, maybe like, you know, 2A and 2B or something. I don't remember exactly how we laid it out but some type of study area to the whole state analysis. So it could have drawn on that. And maybe the different iterations change. We try to not have quite as many tables.
Mary O'Lone: Well I'm – this is Mary. I'm beginning to think maybe it would be a good idea to send all the tables in because I know that, you know, there were some questions here about numbers and stuff.
Marianne Engelman Lado: So we could certainly look for any tables that we had that included the statewide analysis which is the piece here and because, you know, if we have something. Also, you know, as these tables were being developed Dr. Wing and Dr. Johnson may have gone back to the data and tweaked, you know, and found that there was a mistake that we included NPDES permits or we included something else that had to be cleaned up. So I don't want to send over stuff that isn't correct, isn't final, right? But because – because they worked on this and as I said before there was a lot of work going into refining the data and then refining the methodology. So but what we can look to see if there were – I do have a recollection that we may have had some near final tables that might have included the statewide data. And we just thought it was too much. So if we have that we can certainly send that over and we'll look for that. I'll put a star next to that as a to-do.
Mary O'Lone: All right, thanks and when – just asking. So the tables don't have headers on them. They're descriptive like the ones that are here. So table 1 is –
Marianne Engelman Lado: I'm not sure were looking for a totally free standing table or is Dr. Johnson said it may have been this table with an additional column. And we just thought it was too confusing to have all that information in one column. It's that kind of thing. So – so it would have a header, you know, if it were a near final version. But I just don't – it's a couple of years ago. And by the time the revisions came long it was more like using this 2014 version as a base so some of these questions weren't revisited again. So its two years ago and I'd have to look back and confer with Dr. Johnson. But I think there may be something that we can send over to you with statewide data.
Jill Johnston: Yes, we may have to format I'm not sure all the information ended up in this final

format but there is a version of the data available.
Mary O'Lone: OK, all right. So turning back –
Marianne Engelman Lado: Just to be clear as I read this and Mary you can correct if you're looking for something that I'm not thinking about or Dr. Johnson correct me if I'm wrong about this. But the data is actually in on page 6. It's just that it's not presented in, you know, in table 2 and the references from table 2 and that's a little confusing. So if we can find that so it, I'm happy to do that. But it doesn't --Dr. Johnson does it change any of your conclusions or is there anything different or new about that data?
Jill Johnston: No, I think it's consistent with what we – with the table that we show. And that, you know, the number and the text and what seems to be in this complaint form are correct.
Mary O'Lone: OK. So, you know, we wanted to – I'm looking at the clock it's five after four. But we wanted to, you know, march through sort of these paragraphs to have you, you know, do what you've been doing so far which is that it's saying yes, that's an accurate characterization of this – this table. And then, you know, after that we have a handful of other questions. But I'm wondering if there's an easier way to do this than just doing it on the phone here so that we can move on to the other kinds of – the other questions that we have. Did you -- Dr. Johnson, did you write these paragraphs that are in the complaint or did you – and or did you – did you write them? That's the first question.
Jill Johnston: No, I did not write them.
Mary O'Lone: OK. Did you review them all before they, you know, came to EPA?
Jill Johnston: I reviewed a version of them. I can't say whether it was the final version or not.
Mary O'Lone: Yes, here's what I'm trying to do. Marianne and I think you probably see what I'm trying to do here. I just want to make sure that – that Dr. Johnson, she didn't write it, but she does agree with what it says. And that's all I'm trying to do to make sure that now when we use it, you know, when we – if we were going to, you know, use the languages in here – that we can adopt it just trying to cross that "T" here.
Marianne Engelman Lado: Let me propose this since Dr. Johnson – we didn't know that this was what you're going to do and Dr. Wing also reviewed these paragraphs. And well, you know, we may have six typos after he reviewed it. He definitely reviewed the final version. I – but perhaps since we didn't expect this line of questioning and Dr. Johnson has a copy of the complaint after the phone call either if you can identify which paragraphs you want her to review –
Mary O'Lone: Sure.
Marianne Engelman Lado: And she can look at them and we can follow up. And if there are any points of divergence of course Dr. Johnson should say so on those paragraphs. But why doesn't she have time to review them and she can get back to us.
Mary O'Lone: Yes, I think that's more efficient.
Marianne Engelman Lado: OK. OK, is that OK with you Dr. Johnson?
Jill Johnston: Yes, I can do that.
Marianne Engelman Lado: OK. Which paragraphs is it or do you want to e-mail us?
Mary O'Lone: We're going to e-mail it. Yes. And we'll have to e-mail you the list. OK, the next question is I think we're already gone. It's hasn't been – the study has – now we're moving off the, you know, this sticky thing and moving into more general questions. So the study hasn't been published. And you're checking Marianne on whether it was provided to DEQ.
Marianne Engelman Lado: Yes.
Mary O'Lone: OK. And I don't think we need to ask the next two. Do you know has this been

made public in other way?
Jill Johnston: I believe that it's on Earth Justice Website.
Mary O'Lone: On the Earth Justice Website?
Jill Johnston: Is that correct?
Mary O'Lone: OK, then maybe I will after next question. Are you aware of any of response or criticisms or critiques of the study, you know, that are out there?
Jill Johnston: I am not and Dr. Wing hasn't shared any with me if he has received something.
Mary O'Lone: Marianne have – have you?
Marianne Engelman Lado: I'm thinking. To be – to be as – as complete as I can but I'm racking my brain and I – I don't think I have received any critique or response for the disproportionality analysis.
Mary O'Lone: OK, all right. Well, you know, if you do come across anything, let us know. OK, now – now I just wanted to talk about the 2000 study. And mainly it's the differences between the 2000 study and the 2014 study. And, you know, sort of why those changes occurred if you know the answer. So, one of the changes was –
Marianne Engelman Lado: I'm sorry before you go in to that, I like you to just hold up the –
Mary O'Lone: Yes.
Marianne Engelman Lado: -- our Website and it look the disproportionality analysis is available through our Website.
Marianne Engelman Lado: Not on our Website? Where?
Unknown Female Voice: North Carolina Policy Watch.
Marianne Engelman Lado: North Carolina Policy Watch.
Unknown Female Voice: OK. Complaint or the study?
Marianne Engelman Lado: The study.
Mary O'Lone: OK, good, OK.
Marianne Engelman Lado: But – OK, then if you heard that the 2014 analysis seems to be available on North Carolina Policy Watch. We – just also so, you know, this is a little bit of an aside from this interview but we have not generally made available the declarations to the press or to other people. We – we in general when we've gotten inquiries we will call the declarant that might have information responsive to an inquiry and ask whether it's OK if we share their declaration, even for people who did not ask to have their information anonymous. I mean it's anonymously and – and as, you know, there was – that – that there was that category as well. But we are, you know, -- we are respectful of people's courage and concerns about retaliation and so we've been very careful not to just throw everything up on the Website. And it doesn't run to the disparities analysis but we haven't just put all the exhibits up on our Website or in any other place. So, that's – that's part of the backdrop as to why I'm not clear to where we sent what.
Mary O'Lone: OK. Did North Carolina Policy Watch just pick this up off of your Website? So, I'm wondering, so you said you haven't received any critiques. I guess I'm wondering or criticisms or, you know, any – anything not off the wall. Could it have gone in to –
Marianne Engelman Lado: North Carolina –
Mary O'Lone: North Carolina Policy Watch.
Elizabeth Haddix: It's a – this is Elizabeth.
Mary O'Lone: Yes.
Elizabeth Haddix: North Carolina Policy Watch picked up the complaint from the Center's website and I'm not recalling any discussion that I had with them. But it would not surprise me

at all because they're – they are investigative journalist that they would dig into studies referenced in the complaint and share this with the public. So, in that – since the 2014 study, I mean it was not confidential, it's not surprising that they posted it on their Website.
Unknown Female Voice: And Dr. Wing may have been talking to members of the public and providing copies since it wasn't confidential.
Mary O'Lone: OK.
Elizabeth Haddix: I'm pretty sure that they had also posted the 2000 report a long time – years ago.
Mary O'Lone: Right.
Elizabeth Haddix: So, it – it could be also that they've just been tracking Dr. Wing's work so.
Mary O'Lone: Do you have a relationship with them or they just pick your stuff up and – and they put it up there. Because what I'm wondering is whether they were on the receiving end of anything legitimate as far as the critiques.
Elizabeth Haddix: I do – we do have a relationship with them, a collegial relationship with them so we could find that out if you're interested or.
Mary O'Lone: Yes, we, you know, we're interested – we are interested in it. I mean we're going to look too but we don't know what, you know, if they curate their site or what happened. So, we would be interested if – if they happen to have anything.
Elizabeth Haddix: I'll find out.
Mary O'Lone: OK, sure, great. Thank you. OK, so – so circling back Dr. Johnston to the – to the 2000 study and some of the changes in the methodology from that study to the 2014 study. One of the things that was discussed in the 2000 study had to do with well water. And looking at those that were – you know, somehow including those and now I can't remember because I'm – I'm looking for it now. But that was taken in to account, but that wasn't discussed in the 2014 study.
Jill Johnston: So, my understanding in this report they looked at sort of three different vulnerable populations. One being racial and ethnic minorities, one, do you know looking at people living poverty, and a third looking at people who are relied on well water, but so – the – all the three variables were not included in one model but they were sort of three parallel analyses that looked at the correlation between those different characteristics of the population and proximity to CAFOs.
Mary O'Lone: OK. And the well water component wasn't done in 2014, do you know – is there a lead in –
Jill Johnston: Yes, I mean so specifically we kind of prioritize looking at racial and ethnic disparities in that analysis. And just – just a limited capacity focused specifically on that issue. But also – so the 1990 census included information about people's drinking water sources. But that to my knowledge that is the last census that included that data so if we wanted to look at data in, you know, in the 2020, I 'm sorry in the 2010 census, they did not include questions asking about drinking water.
Mary O'Lone: All right, great, thank you.
Marianne Engelman Lado: It's like this is Marianne if I could just interject, so because this is – this was not a general study for the general public but a study to test whether there was a racial disparity related to the general permit, the – the request was to examine that question, whether there are disparities on the basis of race and ethnicity. So, you know, there's a difference between doing a study, you know, for the general inquiry of, you know, of vulnerable populations and – and their relationship to CAFOs and looking into the relationship on the basis

of race and ethnicity and whether the civil rights law is violated. So, it was really a question as to whether or not there was a disparity that cognizable under the civil rights law that, you know, that Dr. Wing and – and Dr. Johnson generously took up. So, that you know, -- that's a big part of it here.
Mary O'Lone: OK. Yes, I – I understand what you're saying Marianne. OK, the – so the next question it has to do with the distance and we talked about a little bit earlier. And I think that 2000 study did one and two mile buffers and now this one goes to three so can you – can you – and the next one has to do – the next question I have has to do with the measurement. The idea of moving off the buffer zones around the, the block group area to using the centroid. So, I mean maybe it's all related but if you could explain that.
Jill Johnston: Yes, yes so a major difference between the – for the spatial approach that we took in these two different reports is in the 2000 reports they relied on block groups. And so here there was a little over 4,000 black groups included I believe in the study area. And so, with our report we have over 200,000 blocks in our study area. So, the size of the blocks and the size of the block groups are very different especially in rural areas because they sort of (inaudible) to have, you know, similar types of populations in terms of counts in the – in these different census like geographic areas. And so in rural areas the block groups tend to be very big and so – so they were looking at the – the principal analysis in this 2000 report wanted to see if there was any CAFO in the block groups. And then as sort of a sensitivity approach because, you know, you can have a CAFO right in the corner of a block group and so that could impact it's neighboring block groups as well or a proportion of that population. So, as a sensitivity approach they also looked at, sort of one mile around the block group and then two miles around the block group and included, you know, the category of whether or not it was near a CAFO or (inaudible) adjusted based on those parameters. So, in contrast when you look at blocks, I don't remember the exact number but, you know, there's a little over 2,000 CAFOs in the state so if we were just to assign exposure based on whether or not there was a CAFO in the block, you know, that went down to like fewer than a thousand blocks because they're just much smaller. And so for – for this analysis it – when – when you're using blocks as your unit of analysis then – then you need to consider, I mean, we believe it's important to consider, a buffer zone around it because we know how chemicals can travel off-site. And so, you know, using evidence, a lot of papers that have been published since 2000, we sort of relied on a – a three mile buffer for the 2014 report. But that is – I mean the – the spatial scale of the two are just, are just very different and so that's part of these (inaudible) what kind of buffers were considered.
Jeryl Covington: Let – let me ask a question– and this is Jeryl so I'm – I'm understanding that you all looked the block group and you are still considering I guess the travel, the air emissions of H2S, you all didn't overlay on this one as well to come up with that distance.
Jill Johnston: On the 2000 report?
Jeryl Covington: Yes.
Jill Johnston: So, the choice of the one and two mile buffers I cannot specifically speak to.
Jeryl Covington: OK.
Jill Johnston: As our part – I believe the data presented here in the table don't specifically include the buffer zone but that was used as a sensitivity analysis. So, if we included these buffers or change their definition of exposure with the patterns that we see changed and – and from my understanding of this report, you know, the patterns were – were consistent but I believe the tables show, rely on the definition of that, of block group is exposed if there's a

CAFO in that block group.
Jeryl Covington: I'm going to repeat that. So, you're saying the block group is exposed if there is a CAFO in that block group?
Jill Johnston: Yes, that was the primary definition of the analysis from – from my understanding in this 2000 report.
Mary O'Lone: And the one and two mile buffer around the block group, was not that populations were measured one and two miles outside of that block group? For some other reason.
Female: Yes, so it would take – so perhaps there would be no CAFO in a block group.
Mary O'Lone: OK.
Jill Johnston: But if you do a one mile buffer around it there would be a CAFO. So, under that condition you would include that block group as this population is exposed to a CAFO. And – it doesn't specify I assume because it's block group that's using like around the – one mile around the buffer rather one mile from the centroid.
Mary O'Lone: Yes.
Jill Johnston: Because – you know, because block groups are so much bigger so – so you wouldn't get much outside the borders with that definition.
Unknown Female Voice: Dr. Johnston –
Jill Johnston: Yes.
Unknown Female Voice: And so just to – just to make sure I have it and it's clear when you say you would include that CAFO that's in the buffer up to two miles away in exposure that would be in the sensitivity analysis but not in – I don't know what you call it but the core analysis.
Jill Johnston: Yes, that's how, you know, I don't want to say 100 percent because I did not make these tables. But as I read this paper and how I understand the data presented is they're not using the – the buffered definition. They're – they're just using the category of whether or there's any CAFO inside the block group.
Mary O'Lone: OK, OK, anybody else? All right so the next question and Marianne, I think this probably goes back to what you've already said but, why was poverty omitted this time?
Jill Johnston: Yes, I think it goes back to the same point is that we were, you know, looking at – at criteria that were considered under the – the civil rights act.
Mary O'Lone: OK.
Jill Johnston: And – and so, you know, poverty not being one of those classes considered we didn't include it in the analysis.
Mary O'Lone: OK. Are there any other differences that you by chance know about between the 2000 and the 2014?
Jill Johnston: I mean, you know, the – how we assigned which people were exposed were different. Also this analysis includes all commercial CAFOs in the state of North Carolina whereas the 2014 we restricted to those CAFOs that are covered under the general permit. So, it does not include ones under the individual permits or under NPDES.

Unknown Female Voice: Ok.
Unknown Female Voice: Didn't you Dr. Johnston, explain what you mean by how the – how people are assigned. Are you referring to the use if quintiles and can you explain what the significance of that is.
Jill Johnston: Yes, so actually now (inaudible) – you're considered to be exposed to a CAFO if

you live in a block group with the CAFO, you know, whereas in our – in our 2014 report, you're considered to be exposed to a CAFO if you're – the centroid of your block is within three miles of a CAFO.
Unknown Female Voice: Right.
Jill Johnston: But, yes, here also the – we – we take a similar approach to using your categorical variables to account for non-linearity in the relationship between, you know, the racial composition and proximity or exposure to CAFOs. But in this 2000 analysis they divide the group so that in each of the prior groups there's an equal number of block groups in it. So, that's how they defined their power point. So, for example like the – what was quintile is (inaudible) to 2.3 percent, the highest quintile is more than 44 percent people of color. Whereas in the updated (inaudible) we used partly just – because we thought it was a little bit more intuitive and easier to understand, we categorized the percent people of color in to equal – like equal percentages. So, our reference group was the zero percent people of color because that was a high percentage of population where they live in blocks with no people of color and then divided it from, you know, more than zero to 20 – 20 to 40 in this group of 20 percent. Because it's – it's a low risk I think easier to communicate rather than having to talk about, you know, this quintile versus that quintile and also because then we're able to look at, you know, these census blocks that are majority people of color.
Unknown Female Voice: So, Dr. Johnston so that the – just a follow up on that. So, that if you used quintile it would have – would you – it would have been difficult to say anything meaningful about the effect of living in a – over 60 percent versus over 80 percent people of color community but using your methodology you could get more granular on that basis? Is that – is that right?
Jill Johnston: Right
Unknown Female Voice: I didn't hear the answer.
Jill Johnston: I'm sorry. Yes, that is correct.
Unknown Female Voice: Ok.
Mary O'Lone: OK. Anybody else have any other questions, comments? OK. So, the 2000 study and – and, you know, maybe you – you may not be able to answer this but are you aware of any criticisms of that study? So, I think that – wasn't that submitted in one of the general permit processes? So, I'm wondering if it got more play in the outside world then if, you know, what reaction there may have been to that that you're aware of or critiques?
Jill Johnston: I mean it was published in Environmental Health Perspectives which is a high quality journal in environmental health and went through a peer review process. But I can't speak to any of critiques of it.
Mary O'Lone: OK. All right, where are we now? I think we're close to wrapping up here. We have a general – one – one last – one question here is the – is the generic one that's – that's all experts get asked and you probably seen it on TV which is the – you know, were you compensated for doing the study.
Jill Johnston: No. No, I was not.
Mary O'Lone: OK. And the other question I have – I heard somebody laughing, were wondering if – if you had worked with Dr. Wing on any other studies related to swine and – and swine farms of North Carolina.
Jill Johnston: Yes, I worked with him and also Dr. Guidry around an analysis of hydrogen sulfide concentrations near middle schools in Eastern North Carolina which was recently published.

Mary O'Lone: OK, that was – I think that is in your CV or was referenced in your CV, is that right?
Jill Johnston: Yes, yes.
Marianne Engelman Lado: And – and I was just going to interject here that that work and – and Dr. Johnson's experience working on studies generally community based participations studies and other work in the community on which she might base opinions about the adverse impact of – of swine (inaudible) could be subject to another interview as we kind of went back and forth on – that wasn't kind of the premise of this interview but –
Mary O'Lone: Right.
Marianne Engelman Lado: But she's generously said that, you know, if – if she knows in advance that she'd be more than happy to talk to you about that body of work and the research associated with it.
Mary O'Lone: OK, that would be great. Did – did the hydrogen sulfide study get submitted with the materials you sent in April Marianne?
Marianne Engelman Lado: Yes, it is the study that is – it was confidential at the time but it has since been published. So, it – it's – it exhibit but it also says it's confidential.
Mary O'Lone: OK, so –
Marianne Engelman Lado: It was pre-publication at that point.
Mary O'Lone: We have a – the – I'm trying to find – do we can – can send us the publication copy just to make it easy?
Marianne Engelman Lado: Yes.
Mary O'Lone: For us the – the published version, that would be great. You have any other questions right now, do you have another one? I don't think so. Is there – is there anything else that – that you wanted to add Dr. Johnston?
Jill Johnston: You don't – no, I don't believe so, I think if you have a chance to review our updated report then I'm happy to answer any questions or if there are any clarifications related to that but it – it I was a pretty parallel structure to what you have, we just refined the- which CAFOs were in included in the analysis.
Mary O'Lone: OK , and so, yes, and I'm kind of thinking Marianne since I haven't had a chance to look at it that, you know, how we were going to send you the paragraph that we wanted to do. I have a feeling we're going to have to– we have to fix it because we have to switch it now to the – to the newer study. So, the a newer study – what you submitted Marianne, is it going to include – is it just a new study or do you have a cover letter that it's like the complaint that goes through and, you know, here's the – here's the layman, you know, description of what is in – the support.
Marianne Engelman Lado: So, it's a little bit of a hybrid in the sense that we have the complaint and we're – we're filing additional submissions in support of the allegations in the complaint. We don't amend the complaint and say this goes to paragraph 132, we rather are just submitting additional documentation in support of those allegations. So, there is a – a short cover letter but it's not – it's not lengthy and, you know, doesn't go in to which paragraph that it supports.
Mary O'Lone: OK.
Marianne Engelman Lado: OK, the other thing I was thinking might be useful since we're ending up a little bit early which is good is just to say a little bit more about Dr. Johnston's experienced, you know, and background and expertise on methodological issues and, you know, -- and of courses taught-- or research done or you have her CV and I think Jeryl Covington asked some questions earlier on but if you have any questions about that – or I

would just open up to Dr. Johnston to say a few more words about whether you have taken any courses or have any special training or expertise on methodology in epidemiology and public health.
Jill Johnston: Sure. I mean I guess the starting point is, you know, that's – this was not submitted to the peer review process but there's a recent publication that – that I authored in the American Journal of Public Health. That – that sort of uses are very similar approach to a racial disparities analysis. It's around a different topic looking at waste water disposal wells in – in South Texas so not related to industrial animal operations. But, you know, went through the peer review process used block level data and – and a very similar approach to that. So, there is some, you know, some of – some of that sort of expertise and – and credentials in the peer reviewed literature that – that is similar methods to what we're doing here in this paper. You know, but also, yes I mean I do have fairly expensive course work and the – these different types of – of progression modeling, epidemiological study design and also just quantitative data analysis, processes like both in, you know, in biostatistics and epidemiology and then also in the econometrics. And – and then, you know, I had a two year post-doctoral fellowship in environmental epidemiology and – and co-taught a class with Dr. Wing specifically on community based epidemiological methods and environmental justice.
Mary O'Lone: OK, well thank you actually that was helpful particularly to the reference to the West Texas or the – the –
Jill Johnston: Yes, so that article I mean I can send it to you but it's also included in my CV and, yes, may be helpful I – I think (inaudible) critiques on – on the – from the oil industry but nothing that – that was really methodological driven but – but yes that can – it's – it's a reference in the peer reviewed literature that's – that takes a very similar approach to – to how to analyze data in a racial disparities analysis as this one does.
Mary O'Lone: OK, is it – is it easy for you to send us that report too? Because that – that –
Jill Johnston: Yes.
Mary O'Lone: -- I think that would be helpful and then –
Jill Johnston: Then maybe I could send it to Marianne and then – and in her package she can share with you.
Marianne Engelman Lado: Yes.
Mary O'Lone: Great. And the – the oil and gas industry comments or response or whatever you want to call it. How – like what form did that take?
Jill Johnston: It came out to a reporter that shared it to me – with me.
Mary O'Lone: Can – would you be willing to share that as well?
Jill Johnston: Yes, let me – let me review it but probably –
Mary O'Lone: OK. OK, did anybody else have any questions at this point? OK.
Marianne Engelman Lado: So, we – we have some follow up, we have some things to give you, we'll wait for your list of paragraphs as well and exchange information and then it sounds like on – on the – the follow up report that was submitted this year as well as the more recent study, as well as other studies and work on the adverse impacts, we should schedule another interview time. And we can try to do that relatively quickly I think if – if you'd like so let's try to get that all under way.
Mary O'Lone: Yes, I think we'll have to – to get back to you on that.
Jeryl Covington: Yes, yes Marianne what I – what I have identified so far is that you will be sending after you review the background, the statewide study so that we can correlate the tables and the statewide data that you have in the – in the report. We will follow up on whether that

questions for the paragraphs are relevant. We need to review the data that you just sent to us on April 12, 2016 to see if those questions have been answered. So, we'll have to review that e-mail and I did receive those e-mail submission. So, let us look at that and then we'll probably coordinate amongst ourselves on the follow up interview with Dr. Johnston and yourself.
Marianne Engelman Lado: Sure (inaudible) if you could send me some dates. I – I think what we said on the statewide data is if there are final charts again, I think it's just a reference problem in the complaint to this table 2–
Jeryl Covington: Yes.
Marianne Engelman Lado: If there was another table 2 with the state wide data or another table with the state wide data or another column in an earlier draft that, you know, sufficiently well along, we'd be happy to send it to you.
Jeryl Covington: OK.
Marianne Engelman Lado: But we will – we'll look for that and get back to you on that.
Jeryl Covington: OK. And then – the follow up we did receive in the April 12 submission the Guidry report that is marked confidential and I think you're going to submit that after publication without the confidential reference to it.
Marianne Engelman Lado: Correct.
Jeryl Covington: And then Dr. Johnston is going to do the supplementary information on the oil and gas disparity analysis literature to you and then you'll subsequently submit that to us.
Unknown Female Voice: So, I think it would be the publication as well as she's going to review the feedback she got to see if it's appropriate to forward.
Unknown Female Voice: Right.
Jeryl Covington: Right. OK.
Marianne Engelman Lado: Terrific. OK, OK. Thank you.
Mary O'Lone: Yes, I think that's it for now.
Unknown Female Voice: OK.
Marianne Engelman Lado: OK.
Mary O'Lone: All right thank you very much and thank you Dr. Johnston.
Jill Johnston: All right thank you.
Mary O'Lone: OK, bye-bye.
Operator: The leader has disconnected, the conference will now end.
END

EPA

Moderator: Jonathan Stein
June 7, 2016
1:54 p.m. ET

Operator: This is Conference # Ex. 6 - Personal Privacy

Ericka Farrell: Hello.

Marianne Engelman Lado: Hi, it's Marianne Engelman Lado and Alexis Andiman from Earth Justice.

Ericka Farrell: Hello Marianne and Alexis. This is Ericka Farrell from Title VI, OCR.

Marianne Engelman Lado: Hi there.

Jeryl Covington: This is Jeryl Covington with OCR.

Johanna Johnson: Hi, this is Johanna Johnston from OGC. I believe we're just going to wait a couple more of more minutes. We're waiting for somebody else to join us on our side. Is Dr. Wing on the phone?

Marianne Engelman Lado: Not yet.

Ericka Farrell: OK.

Elizabeth Haddix: Hi, it's Elizabeth Haddix at the Center for Civil Rights.

Ericka Farrell: Hi Elizabeth, this is Ericka Farrell from the Title VI OCR office and then we also have Jeryl Covington and Johanna Johnson.

Elizabeth Haddix: Great, great. Hope everybody is well.

Ericka Farrell: Yes.

Marianne Engelman Lado: Hello Liz it's Marianne and Alexis.

Elizabeth Haddix: Hey there.

Marianne Engelman Lado: I'm going to send Steve a quick note.

(Unknown female voice): Hello.

Steve Wing: Hello, this is Steve. Sorry for being a few minutes late.

Elizabeth Haddix: Hey Steve, it's Elizabeth and Marianne and Alexis are on too.

Steve Wing: Oh, so we're waiting for?

Elizabeth Haddix: I think EPA's on as well EPA.

Marianne Engelman Lado: They're on yes. Hi Steve.

Steve Wing: Hello.

(MEL or EH): So we have folks who will introduce themselves in the office of civil rights and the office of general counsel. I think they were also waiting for one more staff member from the Office of General Counsel.

Mary O'Lone: OK. I think EPA's also here now too.

(Unknown female voice): OK, great.

(Mary O'Lone): Do you want to…

Ericka Farrell: OK. So is Dr. Wing?

Johanna Johnson: Yes, he joined us.

Ericka Farrell: OK, good afternoon everyone. Again this is Ericka Farrell from the office of civil rights with the U.S. Environmental Protection Agency in Washington D.C. and thank you for taking the time to talk with us. And as you know the

office of civil rights is investigating whether North Carolina Department of Environmental Quality, sorry, regulation of swine feeding operations discriminate against African Americans, Latinos and native Americans on the basis of race and national origin and neighboring counties and violate Title VI in EPA's implementing regulations.

And just so that you know, this interview will be recorded. And for the record Dr. Wing, can you please provide your full name?

Steve Wing: My full name, Steven with a V, Bennett Wing.

Mary O'Lone: And can we – this is Mary O'Lone from EPA Office of General Counsel. Can we just go around and say all who's on the phone before we sort of launch in here? So this is Mary O'Lone from the office of general counsel at EPA and we'll go around the room here.

Johanna Johnson: Hi, this is Johanna Johnson. I'm also from General Counsel at EPA.

Jeryl Covington: This is Jeryl Covington with the office of civil rights at EPA.

Ericka Farrell: And again this is Ericka Farrell from the Office of Civil Rights Title VI office.

Mary O'Lone: Marianne, you want to do your group?

Marianne Engelman Lado: Sure so I'll start. It's (Marianne Engelman Lado) and I'm with Earth Justice. (Alexis)?

Alexis Andiman: Alexis Andiman also with Earth Justice.

Marianne Engelman Lado: And Elizabeth.

Elizabeth Haddix: Elizabeth Haddix at the UNC Center for Civil Rights.

Brent Ducharme: Brent Ducharme also at the Center for Civil Rights.

Ericka Farrell: OK, that's it.

Mary O'Lone: And then Dr. Wing. OK yes.

Ericka Farrell: OK. Now again Dr. Wing could you provide us your professional contact information specifically your office address, office telephone number and office email.

Steve Wing: Yes. My address is Department of Epidemiology, Campus Box 7435, University of North Carolina, Chapel Hill, North Carolina 27312. Phone, 919-966-7416. Email, steve_wing@unc.edu.

Ericka Farrell: Thank you. And we're going to start with a line of questioning.

Mary O'Lone: So this is Mary O'Lone and I wanted to say you know thank you Dr. Wing for making yourself available for the interview and that you know if at any time you need to take a break or we need to break just let us know and we'll do that. And then also if we need to end early and you know reschedule or whatever we'll make whatever accommodations we need to.

Steve Wing: Thank you.

Mary O'Lone: But we very much appreciate you making yourself available. So we're going to start off with some quick sort of one off questions and then get into more of a general conversation as we go on. The first question was just was – is have you ever conducted any research that was funded by the pork industry?

Steve Wing: No I have not.

Mary O'Lone: Have you ever conducted any research on behalf of the North Carolina legislature such as the environmental review commission or any part of the North Carolina legislature?

Steve Wing: No I have not.

Mary O'Lone: OK. And this is just a general question about your research. So we see you know we see that you've focused on the swine industry and I'm just sort of wondering if you could give us a little background as to why not all CAFOs in North Carolina but you know why you focus on swine.

Steve Wing: Well I was introduced to the problem in 1995 when I began to meet residents of eastern North Carolina who were impacted in their neighborhoods by swine

operations. So I followed and I researched. I learned early on that there were – there was quite a bit of research about the swine confinements, the new liquid waste management systems. But it was almost entirely about the engineering of the waste pits and the spray fields, animal nutrition, veterinary practices and so on and there was not any literature on environmental health impacts.

And because the residents that I met believed they were being most affected by the swine industry and keep in mind this is 20 years ago, I decided to focus on that. The poultry industry had not expanded as much at that time as it has now. Also because of the engineering waste management practices, the liquid waste systems I believe had more potential for impacting neighbors than the dry litter system that most of the turkey and chicken operations use.

They are not benign but at the time I began it appeared to me that the swine operations were more important and furthermore they had developed very rapidly. The number permitted had increased very rapidly. And one of the other – one of the other issues that was brought up repeatedly by the residents that I met was that these facilities were disproportionately placed in communities of color. So it was that combination of issues that led me to focus on the swine operations.

Mary O'Lone: I have a question about you know the increase in the number of swine over time and I have to be – I have yet to figure out the answer to it and I'm hoping maybe you can help me. So in your declaration you say that between, I think it was the early 80s and 2007, the number of swine increased from 2 million to 10 million. And then we also see that there was a moratorium on the expansion of swine facilities and you know permitting of new facilities between '95 and 2007. And I've been trying to figure out if there's, you know when I read the sort of plain language of what is a moratorium and no expansion and no new ones, how the numbers of pigs jumped.

Steve Wing: The expansion was primarily during the period of between the early 80s and 1998 and thereafter the numbers fluctuate. There were some facilities that had applied for permits before the moratorium that weren't able to open, but for the most part the growth was between around 1980 and the late 1990s.

Mary O'Lone: OK, all right. Now we have some specific questions regarding the disparity studies and then after that we're going to just sort of focus on your interaction with North Carolina DEQ and the swine regulatory – the swine waste regulatory process. But we had a specific request about the October 19th, 2015 update. And you know we read that you had basically cleaned the coordinates, you know to make sure that you had the right ones before you did the analysis. And we were wondering if we could get – if we could get those coordinates and any information you have describing the changes that were made to the North Carolina coordinates and the reasons for those changes.

Steve Wing: Definitely. I'm, you know I haven't done the programming myself, but I can contact either Jill Johnston or one of the research assistants at UNC and we can provide that to you.

Mary O'Lone: OK that'd be great. We have spoken to – we spoke to Dr. (Johnston) I'm sure (Marianne) told you and she was able to answer some of our questions about the 2014/2015 study, but we still had a couple that we would like to ask you. And you know part of this is just – a lot of it is us, we're not epidemiologists, trying to get a firm grasp on how we articulate to policy makers within EPA and those that we have to talk with. You know being able to explain in very plain terms what your study says and, you know, what it means.

And one of the – one of the questions that we have is just about getting a grip on the methodology that's used to count people in the two studies, in the one you did in 2000 and in the 2014/2015 study. And we were trying to figure out different ways to, you know, have you help us. And I think what we came up with we thought might be the easiest would be for the 2014/2015 study would be to look at table four and just, you know, march us through the numbers. Do you have it in front of you by any chance?

Steve Wing: I'm looking at table four right now from the updated study.

Mary O'Lone: From the – right. So it's at the top of page 14, right. Make sure we're talking about …

Steve Wing: That's right.

Mary O'Lone: OK.

(EH or MEL): Can you hold on just a second? I'm just pulling it up as well.

Mary O'Lone: Sure, sure.

(EH or MEL): So this is from the 2015 study?

Mary O'Lone: Yes, the 2015 study.

(EH or MEL): OK.

Mary O'Lone: And I was hoping this would help us you know just sort of generally march through how it's done because I have read and reread it the study and just tried to figure it out and it's me. I'm sure. I just have a, I have a tough time processing this kind of information. So in the first column the percent people of color, what you're – that is the, that represents of – tell me what that – tell me what that represents there, that column?

Steve Wing: OK. So the first column percent POC are the ranges of percent for census blocks. So there are if you look at the first and second columns, there are 559,179 people who live in census blocks with no people of color.

Mary O'Lone: And the census blocks are – the census blocks that you're counting are those that have a centroid within three miles of a CAFO, right?

Steve Wing: No this is in this case this is all the census blocks in the study area.

Mary O'Lone: All the census blocks in the study area, OK.

Steve Wing: So the sum of the column population yields the total number of people in the study area. Because everyone in the study area lives in a block that either has no people of color or has less than 20 percent, 20 to 40 et cetera up to 80 to 100 percent people of color.

Mary O'Lone: OK. And to get into the study area you had to be a census block that had a CAFO in it?

Steve Wing: No, that's not the case. The study area was defined as the whole state minus …

Mary O'Lone: OK, right.

Steve Wing: The five major cities and the western counties which have no permanent CAFOs either in those counties or an adjacent counties.

Mary O'Lone: OK and these are all …

Steve Wing: And that's we made following the work we had done previously that had been peer reviewed.

Mary O'Lone: Repeat that. I think I interrupted – I was going to interrupt you but so...

Steve Wing: The decision about how to define the study area mirrored the decision we made in our 2000 publication.

Mary O'Lone: Right, OK. OK, so this is – these are the populations in the study area, OK. So then the ratio's comparing the percent of people residing within three miles of an IHO in blocks with people of color compared to blocks without people of color?

Steve Wing: No, that means that there's a – what we have is the population of each of the categories, the percent people of color, that lives within three miles in a census block within three miles of an IHO divided by the total population gives the percent of people in that group that live within three miles of an (IHO). The ratio column is the ratio of each of the categories above zero to the proportion in the zero category.

Mary O'Lone: Right.

Steve Wing: And it's a way of comparing to look for whether there's a trend across the categories of people of color.

Mary O'Lone: OK. Ok. And then the 95 percent CI, can you explain that?

Steve Wing: That's CI stands for confidence interval. There's for each of these ratios

there's a statistic called the standard error and the 95 percent confidence interval is a standard way of expressing that. It's the standard error times 1.96 subtracted from and added to the prevalence ratio. And it gives an idea of the amount of data that each of these ratios is based on. So, s narrow confidence intervals and these are narrow shows that, if a few people were moved one way or the other it wouldn't make any difference to the prevalence ratio. It's a very stable statistic.

If, for example, looking at the 0.75 in the second row, the confidence interval is 0.74 to 0.75. So, you could move people back between categories and it wouldn't result in much change. But if the confidence interval were say 0.30 to 2.8 then by moving a few people you would get quite a different prevalence ratio. And we provide these confidence intervals because they're very standard. I didn't spend much time writing about them.

Mary O'Lone: Yes, that's all right.

Steve Wing: And but if this report were to be read by an epidemiologist or a statistician or an economist or someone else who uses these kinds of statistics they would expect the confidence intervals to be provided.

Mary O'Lone: OK, thank you. OK now we were going to look at the 2000 study. Do you have that with you by any chance?

Steve Wing: I'm sure, I haven't kind of – no, I have to open it up. Just a moment.

Mary O'Lone: OK. Well, you know, maybe we don't even need to have you look at it in particular but …

Steve Wing: Yes, I remember it pretty well.

Mary O'Lone: OK. Was there the difference between the way you counted, you developed, who was impacted, how you counted the people, seems to be slightly different. So maybe if you could just …

Steve Wing: It is slightly different and I can explain that.

Mary O'Lone: OK.

Steve Wing: So in the 2000 study we wanted to analyze both race and poverty. Poverty is not a variable that's available for census blocks. Census blocks are the smallest enumeration unit used by the U.S. Census Bureau. Race is available at the census block level but not poverty. Block groups are larger geographic areas.

And that study was based on whether there was an IHO in the block group because those areas are large enough to be able to contain potentially numerous IHOs. In the current study we were not looking at poverty and that's because of the way Title VI is written. We just were looking at race and ethnicity. So we could use the census blocks which are much smaller and they would be more specific to counting people and their proximity to the IHOs. So they are less heterogeneous because they're smaller.

Furthermore, we had the benefit of 15 years or so of research where we were getting an idea of, more quantitative idea, of how far away people could be impacted by the air pollutants from these facilities and we chose three miles. At some point any particular radius is arbitrary. Three miles had been used in some of our prior work and based both on our measurements and our interviews with people we felt that it was clear that people can be – can experience negative impacts of the air pollutants at that distance.

So in the latter study the 2015 report, we considered people potentially exposed if they lived in a block that was within three miles of an IHO as opposed to the first study where people were potentially counted as potentially exposed if they lived in a block group, a collection of blocks that had an IHO. And the difference is because of number one, our focus on race and ethnicity, and number two, our increased understanding of the distance over which these facilities can affect people. Does that answer your question?

Mary O'Lone: That answers it perfectly, thank you. And it answers another question that we had about you know over time it seemed like the – you had, there were different distances in different studies, but the more recent ones we're seeing seem to be focusing on this three mile distance and so …

Steve Wing: And I would call your attention to the most recent study that was provided in

your materials published just earlier this year in which we measured hydrogen sulfide at public middle schools. And in that study the quantitative relationship between the hydrogen sulfide levels at the schools and the area of the swine farms that are up wind is about three miles, five kilometers.

Mary O'Lone: Right, right, yes I read that. And I have a quick question about that study. As I read it, what I understood it to say is that the monitor was placed downwind, meaning the wind blows from the CAFO to the monitor at the school and that the measurements of the hydrogen sulfide tended to be higher when the wind was not blowing, when the air was just kind of hanging around.

Steve Wing: OK, let me elaborate …

Mary O'Lone: But there was no measurable, OK.

Steve Wing: Just to clarify that.

Mary O'Lone: OK.

Steve Wing: The monitors were at the schools continuously for several weeks. So during the time the monitors were at the schools the wind blew from different directions and sometimes it was wind speed was below what's detectable, so the air was pretty still. So the monitors were in place during all those conditions, whatever direction the wind was coming from or however fast it was blowing. And what we found was that the hydrogen sulfide levels were very strongly correlated with the number of – or with the area of the swine farms up wind at the hour that the measurement was made.

So basically we took all the hours that were during which the monitor was operating at the school, we divided the weeks up into hours and for each hour we assigned a wind direction and a wind speed. And for those hours when the wind was coming from a direction where there were IHOs and more IHOs and more nearby IHOs, the hydrogen sulfide levels were higher.

Mary O'Lone: OK.

Steve Wing: And when the winds were coming from other directions the hydrogen sulfide levels were either undetectable or lower.

Mary O'Lone: Thank you, that was very helpful. OK, so that was a digression. We're going to go back to the – we're going to go back to the 2000 study and the 2015 study. Were there any critiques or criticisms of the 2000 study when it came out?

Steve Wing: Well I received some verbal criticism and concern. I'm not aware of, you know any publications or letters to the editor or to the journal or anything like that that challenged any of our findings or our methods.

Mary O'Lone: And what – and by verbal criticism what do you mean?

Steve Wing: Well, in maybe it was early 2000 I presented a version of this paper at the annual meeting of the Society of Toxicology I was invited to present the results there. And after I presented the results there was some press coverage and I was called to the North Carolina House of Representatives agriculture committee to testify about this study. And some of the legislators were- they seemed to be concerned about our findings.

I wouldn't say that the criticisms were about – they were not like scientific criticisms about how we analyzed the data or about the quality of the study. It was about our findings that there was this disproportionate impact. Actually I don't know if you have a copy of it but I wrote an article about that experience, that includes a description of that of my appearance before the house agriculture committee. I think it was published in 2002 and it also describes the Pork Council's use of the Public Records Act request to try and obtain confidential information about the study participants in one of our subsequent studies.

And if you're at all interested in the potential that researchers might be, might face some kind of intimidation tactics when they research this topic I could send you that paper.

Mary O'Lone: Yes, would you please.

Jeryl Covington: Dr. Wing, this is Jeryl Covington. I do have one question about your presentation at the legislature. Do you have a copy of or do you know if that

was a recorded meeting or open to the public where minutes might be available from your presentation?

Steve Wing: You know I've never seen any and I don't know, I really don't know whether there was a recording or minutes were taken.

Jeryl Covington: OK. Do you know if you were in a recordable room in the Archdale building?

Steve Wing: I was in the Archdale building in a committee meeting room, but I don't know what their technology was.

Jeryl Covington: OK.

Mary O'Lone: OK, thank you. So …

Marianne Engelman Lado: Let me – this is Marianne. Let me just say we'll work with Steve to collect all this stuff and then we'll send it on to you.

Mary O'Lone: That's great. Thank you.

Steve Wing: And I would also mention you know just (in turn) that there were some pork industry lobbyists at that meeting who approached me after the public session to express their discontent.

Mary O'Lone: You mean after the – after you gave your testimony?

Steve Wing: Yes, that's right. And so these criticisms are not written or public to my knowledge but you asked if there were criticisms and that's what you know in particular what stands out for me.

Mary O'Lone: And is that, were those – do you have that recorded in the article you wrote?

Steve Wing: Yes, I have some information about that yes.

Mary O'Lone: OK great, thank you. Well the next question was like a follow up to that as to whether anything you heard about the 2000 study led to a change in the methodology for 2015.

Steve Wing: No.

Mary O'Lone: OK.

Steve Wing: As I said, the criticisms that I heard were not about how the study was conducted or the data quality or the analytical methods. It was only about the findings and our interpretation.

Mary O'Lone: OK. And maybe just can you just tell us what the basis was, what the criticism was about the findings?

Steve Wing: Basically it was, the criticism was, well what do you expect? This is where the industry goes and it's poor and communities of color.

Mary O'Lone: What? No he's saying that …

Steve Wing: So basically the point that this shouldn't be surprising and it's not really news or anything.

Mary O'Lone: Right, OK. OK, so the 2014/2015 study, did – was that sent, to it was well. I guess the 2014 study was sent to North Carolina because it was attached in DEQ, NCDEQ because it was attached to the Title VI complaint, right Marianne? They got it because it was one of your exhibits and you sent everything to them when you filed the complaint?

Marianne Engelman Lado: I think that's correct but we will double check that.

Mary O'Lone: OK. Did you bring that 2014 study and or the update the 2015 study, other than as a part of the Title VI complaint for the 2014 one, to North Carolina DEQ's attention?

Steve Wing: No, no I didn't work directly with them.

Mary O'Lone: OK. Marianne did you by any chance when you sent it to us, the update did it go to them?

Marianne Engelman Lado: I don't believe it did but I can check that.

Mary O'Lone: OK. So have you …

Steve Wing: So just to clarify for me, DEQ is aware of the civil rights complaint. Is that true?

Mary O'Lone: Yes.

Steve Wing: They have a copy of the complaint, is that true?

Mary O'Lone: Yes.

Marianne Engelman Lado: So I'm going to double check this, but my recollection, you know we before filing the complaint we submitted comments on behalf of a number of groups. You hadn't done the analysis yet, but raising the concern that there was a disparate impact based on all the research that had been done up till that point and asking DEQ to do a disproportionality analysis and a disparate impact analysis. Then when we filed the complaint we – my recollection and I can I'll again, double check, my recollection is we gave them a courtesy call and we sent them a copy as well.

Part of the reason I want to double check is I recall that there was one confidentiality issue and I recall our needing to let both EPA and DEQ know that that one particular map needed to be redacted and that we would send subsequent information. So my recollection is that we sent DEQ the whole package the first time around. Now when we've sent EPA subsequent filings I don't believe that we have sent DEQ additional information. And of course we went through mediation and in the mediation it was clear that they had received the complaint, and it's not clear that they had read it, but they had received it and you know, by that time it was more than a year had passed. So they definitely have the complaint and the study, the first study but I will check to confirm all that.

Mary O'Lone: OK, thank you. So since – and maybe this is addressed to both Marianne and Dr. Wing. Since – have you heard anything from DEQ about the 2014 one? Because if they got one that would be the one they got, right?

Steve Wing: I haven't heard anything from DEQ directly. In fact, but that's not unprecedented. They've never contacted me about any of our research.

Mary O'Lone: OK, well that's going to short circuit a lot of our questions coming down the line here. So we'll get to that to.

Steve Wing: They've had you know they've heard some of the research. I feel quite confident including at the North Carolina environmental justice summit. But they have not approached me with any questions or requests for further information.

Mary O'Lone: OK. So for the 2014 study I guess, I'm debating whether to ask this, but I'm just going to go ahead and ask it. So …

Marianne Engelman Lado: And Mary, I'm sorry can I interrupt you? When you say 2014 study can we just be clear about which one we're talking about because we I think we've – you're not talking about the updated and that disparity analysis that came out in October.

Mary O'Lone: Right, I'm talking about the – well, we can say the 2014/2015 study. But I'm my assumption is that it wasn't made available – the 2015 update had not been sent to DEQ. The only thing they would have gotten thus far is the 2014. So the question is just you know has there been any feedback from North Carolina DEQ on the '14 or the update? And the answer seems to be no.

Steve Wing: From my knowledge correct and there's been no response.

Mary O'Lone: Have you had – has there been any response or anything from the pork industry?

Steve Wing: Not to my knowledge.

Mary O'Lone: OK.

Steve Wing: And this is a topic which is a little bit sensitive. I realize this is not your question directly, but I should mention, I believe you have a copy of the letter that I and some of my colleagues sent to Christine Lawson at DEQ before the new general permit was approved.

Mary O'Lone: Yes.

Steve Wing: You know I have to, I should let you know, that I was told by an official at the National Institute of Environmental Health Sciences that I had violated their policy for extramural researchers by sending that letter. So my contacts with DEQ are of concern to the funding agency that supported most of the research described in that letter because their – they, they have told me that although there was a request for public comments on the general permit which is what I was responding to, that I was only supposed to inform public officials about our research if I was asked as an individual. And so this is another kind of difficult issue regarding working under federal grants is that National Institute of Health apparently has some concern about informing government officials about research conducted with support from NIH.

And so this is – and the reason I bring it up is because it's to some extent, well to a large extent, a disincentive for me to engage in any conversation with government officials including DEQ …

Mary O'Lone: I see.

Steve Wing: Unless they initiate it.

Jeryl Covington: Dr. Wing let me ask you when they, when you receive that information was that one of the stipulations of grant you accepted? That's what they were outlining for you?

Steve Wing: It's not in the grant but it's a policy that was adopted I believe in 2014 but possibly 2013.

Jeryl Covington: OK. But your presentation, your public comments would have preceded that policy initiation or just in the same timeframe of the general permit being issued? Which came first, the policy or the public hearing request by DENR at the time when the general permits were being renewed?

Steve Wing: OK, so I'm looking at the date of my letter to Christine Lawson. It's December 2013 so I'm off by a year. I just slipped there. So the policy came out I believe in 2013 or possibly 2012.

Jeryl Covington: OK because I'm looking at – I'm looking at one of the postings for the public

meeting on the general permit it's dated October 28th, 2013.

Steve Wing: Right, I did not appear at that meeting.

Jeryl Covington: OK.

Steve Wing: The admonition that I received from NIEHS was about the letter that I wrote.

Marianne Engelman Lado: So that is referring to – I'm sorry. Is it exhibit two of the complaint filed in September of 2014.

Mary O'Lone: Right, his comments on the general permit.

Marianne Engelman Lado: Correct.

Jeryl Covington: Yes.

Marianne Engelman Lado: And can I just (while) I've interrupted already, the CC list that you asked about on the complaint field September 3rd, 2014 with your initial study and all of the exhibits included Christine Lawson, Division of Water Resources at DENR and Tom Reeder, Division of Water Resources at DENR. So DENR received, now DEQ, received the original complaint with all of the attachments including the 2000 and – what we're calling the 2014 disparities analysis. We did not have that CC list on the subsequent letter we sent on April, you know or other correspondence that we have.

We're assuming that the Office of Civil Rights is collecting information from DEQ that we're not receiving and we are sending information to the Office of Civil Rights that we similarly are not giving to DEQ. So we didn't, it's my recollection that we did not send that – any subsequent information after the complaint. We got no response to the complaint and then we did not send any additional information, nor did they ask for it after sending the complaint.

Mary O'Lone: OK. All right, thank you. Actually I just want to ask a question about NIEH. Maybe we can talk. So prior to that policy it would have been fine for you to send comments in on a general permit?

Steve Wing: That's my understanding.

Mary O'Lone: OK. For the 2014/2015 study are there any areas that you – any adjustments you'd make to it or that you, you know, would explore if you had more time, money you know whatever however you might want to adjust it?

Marianne Engelman Lado: Before answering just so I'm clear, Mary when you call it the 2014/2015 study, I'm not clear what that is. Can we call the first study 2014 and then the updated study so we just distinguish between them?

Mary O'Lone: Sure. The 2014 study that was updated in 2015.

Steve Wing: Right. I would you know if I had had time and support I would potentially shorten the report for submission to a peer review publication but I wouldn't change the analysis.

Mary O'Lone: OK. Are there any plans to have it submitted for a peer review or publication?

Steve Wing: It's something I want to do, but I've been occupied by other concerns and so I haven't done it yet.

Mary O'Lone: OK. Well our next question was about the distances and we went through that. We did the 95 moratorium. OK, so now we're going to – now we'd like to talk about the renewal process, the general permit and the renewal processes. And so we have your comments for the 2014 process. Did you participate in any of the previous renewals, providing comments and your studies, whatever the studies you had to that point, you know, to DEQ?

Steve Wing: No, I did not.

Mary O'Lone: So this was the first one? OK. All right so now we're going to – we're going to run through the North Carolina specific study and we're kind of going to ask the same questions about each study. And starting with the your 2000 study about occupational and community health effects. So the – well basically the questions we're going to ask are, you know was that, did you or are you aware of that study being brought to the attention of North Carolina DEQ or any other state agency?

So, for example, the first one is about occupational health you know, was it sent to any other state agency that might have jurisdiction over the issue and then to any local agencies? And, if so, was there a response to it? Were any actions taken after they heard about it? And then depending on the study just we're just asking if the methodologies that were used like in the air study were they the kind – is it the methodology that would be used by North Carolina DEQ's air quality division? Or if it's a water analysis were the protocols there the kind that DEQ would use?

So we're just going to sort of march through each study and ask these questions.

Steve Wing: OK so …

Mary O'Lone: Do you want to take a – do you want to take a break or anything?

Steve Wing: I think we can keep going at this point.

Mary O'Lone: OK.

Marianne Engelman Lado: Can I just mention before Dr. Wing answers from his point of view that I don't know the full range of ways in which DEQ might have seen these studies, heard about these studies, you know government meetings, professional organizations. We know something about, and Steve you can talk about the you know you've already mentioned the summit and their appearance at the summit. But I do at least want to point out that in December of 2013, you have it as exhibit three attached to the complaint, Earth Justice, Water Keeper and Southern Environmental Law Center submitted comments on the permit renewal that's the subject of the complaint which cites to many of these studies just looking at it quickly.

For example at footnote 18 cites to Wing and Wolf among others. Footnote 21 cites to Wing and all potential impact. So I don't know how Dr. Wing would possibly have known all the ways in which that information might get to DEQ but you have in your possession at least one example of ways in which that was formally presented to DEQ before they made the decision on the permit.

Mary O'Lone: Yes, yes. And that's sort of what – we're only asking him what he knows about not, you know the ways that he knows it that it may have been brought to their attention. So the idea being these studies you know we're going back to 2000 there have been – general permit has been renewed a couple of times, right in this intervening time period. And so what I'm trying to see other than the fact that he has just said that he didn't participate formally in the hearing process, submit written comments into previous renewals, is he aware himself because maybe he did itt or he participated in you know some meeting with the DEQ or whatever where they were made specifically aware of the studies. OK?

Marianne Engelman Lado: Yes, I mean go ahead. Yes, I want to make sure you use his expertise and time efficiently but feel free. Keep going.

Mary O'Lone: So and I understand they were all brought – they were all brought to the attention of the DEQ in your comments in 2013. What I'm trying to get at is, prior to that, had there been prior instances where any of these studies were formally brought to their attention. That's what I'm trying to get at. And you know we can march through all of them or just if there's a general answer of that he can give that's fine too.

Steve Wing: Well I can say that the Wing and Wolf study from 2000 that Marianne just mentioned, that study was the results were first released by the North Carolina Department of Health and Human Services before the paper was published in the peer review journal. And I can't believe that they would have been unaware of that because there was press coverage and so on. But I didn't send it to them directly and I don't know if DHHS did.

Other than that I can only give the general answer that they have had personnel at our environmental justice summit where some of this research had been presented and discussed in addition to they having the opportunity to hear from neighbors of these facilities who described their personal experiences and difficulties and impacts of the air pollutants on their quality of life, ability to use their property, their health and so on.

Jeryl Covington: Dr. Wing this is one question. You said at the environmental justice meetings

that have happened, the network meetings, you said DENR or DEQ representatives were there. Are you meaning the secretary or members of the water quality section? Who are you referring were at the EJ network meetings?

Steve Wing: I don't have a list of who was there but I'm sure the secretary never came, I'm sure Christine Lawson came. I don't know what years. I don't have a record of that. And I believe other DEQ who are Department of Environment and Natural Resources staff came and there's when Christine did not come.

Mary O'Lone: So the environmental justice summit, I mean Marianne do you have information on these meetings when they occurred and who they were with or?

Marianne Engelman Lado: Yes, we can get you more information about that.

Mary O'Lone: All right, yes. So the – so maybe we can follow up on that later and sort of figure that out. But it sounds like what you're saying is that over the years there have been a series of these meetings, DEQ's been invited and DEQ officials have shown up and that and you've made presentations there about your research.

Steve Wing: I have and so have other colleagues who participated in these studies.

Mary O'Lone: OK.

Jeryl Covington: And this is Jeryl again. I have one question. You mentioned that the Department of Health and Human Services released your Wing Wolf 2000 study. What were their comments to that? What reactions or follow up did you get from the Department of Health and Human Services?

Steve Wing: They actually provided financial support for that work. So their announcement of the findings took the form of a press release basically describing the results of a study that they supported.

Mary O'Lone: And then what happened? Then …

Steve Wing: Then what happened was on the same day that the press release came out the

North Carolina Pork Council filed a Public Record Act request. It was to me and my colleague Susanne Wolf, copied to the UNC general counsel, as well as to the DHHS division that funded the study, demanding under the North Carolina public records statute, all records associated with this study, including the identities of the participants, who, I should note, we had to protect their confidentiality in order to do this study under federal regulation.

Mary O'Lone: OK. So this was partially funded by the federal government or it came a grant through the state?

Steve Wing: Partly funded by NIEHS and partly funded by the North Carolina DHHS.

Mary O'Lone: OK, OK. And so did the Department of Health do anything after just releasing the study? Was there any sort of change in the world?

Steve Wing: You know I'm not sure. You know, unfortunately, what you're pointing out or the line of questioning is pointing out is how isolated many of us academic researchers are from the policy arena. And this is part of academic culture and it's reinforced by government agencies that are concerned that we would actually influence policy, the NIH policy to wit and we're not supposed to contact public officials.

So I've spent most of my time and effort getting the research into the open literature. I've spent some time with reporters. It's been covered not only by you know in the academic journals but to some degree by periodic journalist reports. But I'm not working in a culture that has close connections with the regulators and you know I think that's a problem and I will admit to you that it is. But partly we can't all do everything. And given the pressures to keep my funding and teach and advise students and so on which I have to do to keep my job, it leaves limited time to engage in dialogue and routine conversation with regulators.

Mary O'Lone: OK.

Steve Wing: I mean just to explain my situation.

Jeryl Covington: Yes Dr. Wing let me ask one question here. You mentioned funding. After

you did the publication with the Department of Health and Human Services, the press release was submitted and you got the request for information by the Pork Council, did that impact your funding that was issued - was – did you view that as being retaliatory in nature, the request …

Steve Wing: At the same time I know there was a pork industry request that came through a U.S. senator for NIEHS to investigate our grant. I was told that by our grants officer at NIEHS. We maintained our funding at that time so they did not determine that we had done anything wrong, presumably. But at – I mean it took a lot of time and grief to deal with that but I don't believe at that time it influenced our funding from the federal government.

Jeryl Covington: What about at the state level because I'm assuming that there was a pass through of the federal funds to the state level Department of Health and Human Services?

Steve Wing: No, actually the funds we got from DHHS North Carolina DHHS were not federal funds, they were state funds. And we did not receive any more state funds for this kind of work ever again.

Jeryl Covington: OK. Let me ask you this and I hate to go back but on the press release from DHHS do you feel like they were supportive of your work, dismissive of your work? What you know I want to I guess get clarity what did …

Steve Wing: Right. I believe they were supportive of our work.

Jeryl Covington: What did they do with – what did they do to further it? You said that you received no other state grant, but what did they do to further the study that you and Wolf prepared?

Steve Wing: I'm not aware that they – I'm not aware of what they did beyond make public the findings. I mean I've always presumed that the North Carolina Department of Environment is not in a vacuum that's insulated from all information on the outside produced by government and academic scientists. Now, maybe I'm naïve about this but I've assumed that there was at least through press coverage or some other means that there was some way that they would know about something that happens outside of their department.

Jeryl Covington: Now even with that press coverage can you go back and clarify for me, I apologize, I just want to make sure I understand, were you contacted by any other agencies or any other industries besides the Pork Council after the press release by DHHS?

Steve Wing: No.

Jeryl Covington: OK.

Steve Wing: I mean I was contacted by people associated with the pork industry. In writing, also by phone.

Mary O'Lone: And can you just talk a little bit about that?

Steve Wing: Well the part in writing was the Public Records Act request. I also received at least one phone call, maybe more than one from someone who wanted to talk with me about getting the identities of the study participants. And then gosh that reminds me, I also had some kind of bizarre voicemail that was accusing me of, gosh I don't remember, may have called me a communist or something like that but I didn't pay really pay any attention to it.

Jeryl Covington: Let me ask one question. Who – since you lost this particular state funding, who's funding you at a state level for your continuation in this particular area if you don't mind?

Steve Wing: We have received no further state funds since 1999. I should say that the state health director at that time in 1999 was interested in the problem of these industrial swine operations and their impact on neighbors but he did not continue in his position beyond 2000. So I think it was partly through his interest that we were funded.

Jeryl Covington: How many applications or submissions of study details have you presented back to DHHS or any other state agency for potential funding?

Steve Wing: We have not. They to my knowledge they do not have extramural grant programs set up to fund researchers like me. The one that we had, the funding we had for the 1999 study which was published in Environmental Health

Perspectives in 2000, that study you know Wing and Wolf study was funded because we were collaborating with epidemiologists at DHHS. So it wasn't as though – we didn't apply for it independently.

We were actually collaborating with them because people in DHHS believed that there were problems that needed to be documented. And so they were present at the design phase of that study and participated in deliberations.

Marianne Engelman Lado: I'm this is Marianne. I just want to be cognizant of the time and aware that we sent to you the Office of Civil Rights a tremendous number of significant peer review papers on you know on the impact of hog operations on children, on health effects, on a variety of outcomes. I'm sure you all are watching the clock too, but want to make sure you have time to ask Dr. Wing if you have any methodological or other questions or questions about his declaration as well.

Mary O'Lone: Thank you. We don't actually have any questions I guess Marianne. We've read the studies, we don't have any questions on them right now. And you know to the extent we do we'll follow up and you know either you know work with Dr. Wing if he's available or you know the co-authors if that's possible you know like we were doing before.

So really the last question we had because this was the – this was the information we were most interested in right now was you know Dr. Wing's particular perspective from working in the area for a long time and getting an understanding of how North Carolina has been you know apprised of this from perspective only and then what responses there may or may have not have been to them. And so you know sort of a wrap up question that we had was if you'd had any other if you had any Dr. Wing had any other – had interactions with North Carolina DEQ outside of the EJ summit, which it sounds like there was some, and submitting the comments in December 2013.

You know any interactions that you've had with North Carolina DEQ or any other part of the North Carolina state government either the department of agriculture, labor you know HHS over the issue of regulating swine CAFOs?

Steve Wing: I'm sure I can say very little. I should before I say definitively I could check

my list of presentations that's on my CV. I'm trying to remember. I think they were mostly there was an EPA presentation but maybe not to – not to North Carolina's DEQ.

Mary O'Lone: OK.

Steve Wing: Now here it is. Now let's see, no hold on that's not it. Sorry, I wasn't prepared for this question.

Marianne Engelman Lado: In your legal research and testimony section, page 30 of your CV says the state of North Carolina, Wade County Office Administrative Hearings there was a case that was involving North Carolina there. That has been a …

Steve Wing: Right. That was not about swine operations.

Marianne Engelman Lado: OK.

Steve Wing: But there is a section of my CV that begins on page 16 and which includes many public presentations about these – about this topic, as well as other topics I've worked on the course.

Mary O'Lone: OK.

Steve Wing: It includes academic meetings in universities met at North Carolina State University where I'm pretty sure the one in 2010.

Mary O'Lone: The November 11th, 2010?

Steve Wing: Yes, that one I'm almost positive there would have been DEQ people there but I can't give you any names.

Mary O'Lone: OK, that's all right. That helps.

Steve Wing: And if I may quickly scan through there I might be able to call your attention to another one.

Unknown Female Speaker: Do DEQ people ever come to your school and participate in any of

the presentations that you have in UNC?

Steve Wing: Not to my knowledge.

Unknown Female Speaker: Or your presentations at Research Triangle Park?

Steve Wing: Not to my knowledge.

Mary O'Lone: OK. In your experience have you ever seen any evidence that suggested that the swine farm industry – well that North Carolina has better protected non-minority communities from the impacts from swine farms? Is there – is there …

Steve Wing: Well I can give you my opinion on that.

Mary O'Lone: OK.

Steve Wing: And it's I believe it's informed by experience although it's not something I could give you an equation and make a calculation of my conclusion here. But I strongly believe that these facilities would not have been permitted to operate as they do if they were primary located – primarily located in predominantly white areas in the in other parts of the state. The facilities have extremely obvious impacts. If you go there, if you, I mean and you could now – let me make clear.

You could go there for a day and maybe there wouldn't be much air pollution on that day in the place you went because it's not constant all the time. And the other thing I can say is not every one is affected the same way. Some people are more sensitive than others. And what's presented in our research are the average effects among people in the study not that everyone is affected the same way.

But those caveats aside, the effects of the air pollution from these facilities are obvious and they impact a large proportion of the people exposed. And I believe they would not be tolerated by people who have more political clout and ability to harness resources to protect themselves. I believe that this system exists as it does currently because historically eastern North Carolina

is part of what's called the black belt. Many people descended from slaves who worked on plantations in that region prior to the civil war.

It's politically disenfranchised, there's a great deal of intimidation that dates back to the slavery days and through Jim Crow and lynching and school segregation which is still a great problem. And the population there has not had the resources and has also had the historical exploitation and oppression that's preventing them from being able to insist upon having decent environmental regulations that would protect them from pollutants that would not be tolerated by others. So I think you know that's what we have is as a system would not exist if eastern North Carolina was similarly demographically and economically to for example the part of the state that I live in, the Piedmont in The Research Triangle area or Charlotte or Winston Salem or Greensboro or other areas that are better off.

The industry was only able to flourish in this manner because of the characteristics of the population in eastern North Carolina. I hope that addresses your question. I realize it may be broader but.

Mary O'Lone: Yes, I think it does. We did have a question about in your – in your declaration you mentioned that in Iowa the lagoons are underneath facilities. And, we were just wondering, you know, I mean I can imagine why they were not done in North Carolina but if you would like to expand on that statement for us. Like what you know what is it – can you talk about it and how is it that that it didn't develop this way in North Carolina?

Steve Wing: Well one facet is that the water tables in eastern North Carolina are very high. So the hog waste lagoons in North Carolina store waste to some degree below ground but also above ground because the earth, earthen dams are mounded up above the grade of the land and that's a factor. There's also a factor of temperature, you know the climate's different. There may be other reasons. I'm really not familiar with how the engineering difference is developed between the two states in detail.

Mary O'Lone: OK. Did you all have any other questions? Is there anything else that you would like to add? I'm going to ask in a minute. Is there anything else that you would like to ask, I mean like to say Dr. Wing?

Steve Wing: Well, you know I realize that you have research papers and that that's not really the subject matter of your interest today. But since we're on the phone I did want to mention one thing about some more recent studies that as far as how the studies are designed, the older studies tend to be what we call cross sectional studies where exposed populations, meaning people who are living or attending schools near these facilities, are compared to other people who live or attend school further away. Those studies are common and widely used – it's a widely used design in epidemiology. But they are always subject to questions about how comparable the study population the exposed and unexposed populations are. And because there's no follow up in time they're – it's always possible that the people who have the illness had it before they were exposed because we don't follow them up.

But all the more recent studies they come from a design that is not so often used in epidemiology, but it's a very strong design. And those are the studies in which we measure the pollutants in people's neighborhoods and we show that their symptoms increased when the pollutant levels increased. And I mean by their symptoms their ability to engage in daily activities of daily living. Their mental health, their physical health including symptoms and blood pressure and so on and lung function.

And those studies rather than comparing people who live next to the hog operations to people who live elsewhere, we compared each person to her or himself meaning that they were their experiences when the pollutants were present compared to the same person's experience when the pollutants were lower or absent. And it means not only do we have certainty about the timing that the effects occur after the exposures but the other factors that might differ between exposing populations and unexposed populations in cross sectional studies. Things like diet, exercise, occupation, body weight and so on, medical history. Those are not factors in these more recent studies. And this is something that has been pointed out as a great strength of our more recent work that it really does resolve some of the questions that might be raised about the earlier studies.

I just wanted you to be aware of that.

Mary O'Lone: Thank you, yes. I actually had noticed that, but I can't remember which study it was where it was explained, you explained that.

Steve Wing: Oh good. OK, well I apologize for …

Mary O'Lone: No I'm sort of going through I'm trying to remember which study it was that I was reading that had that explanation about how you were doing it, it seemed to make sense to me. So but thank you for you know pointing that out and pointing out the idea about the difference between the older studies and the newer ones and …

Marianne Engelman Lado: Do you all have more questions? There are a couple of things that I wanted to make sure we got out but if you have more questions I'll wait.

Mary O'Lone: No. The only question that we had Marianne and I think it's probably it may be better addressed to you I don't know and it might be a quickie which is we were reading the change.org petition that [redacted] had written and in it she mentions that even when she that she smells the odors inside her house, even when she shuts the windows as the health department has advised. And so we were trying to – we've been looking around trying to figure out what you know where that came from the health department has advised. Like, do you know what that means what that advisory is, how it comes out, how it got to her, what she's talking about?

So it's not necessarily for Dr. Wing unless he happens to know the answer, but which health department even?

Marianne Engelman Lado: I don't know off the top. Elizabeth, do you know off the top of your head?

Elizabeth Haddix: No.

Mary O'Lone: OK. Well then …

Marianne Engelman Lado: We can ask [redacted] though and you could interview [redacted]. I'll also look back at her declaration to see if there's any more detail. I assume you've already done that.

Mary O'Lone: Yes, we did. Anyway just it was just if you happened to know the answer off the top of your head, otherwise yes, we can go down that path. OK, so you wanted to make sure some things got brought out Marianne?

Marianne Engelman Lado: Yes. And frankly I thought there were going to be more questions and if we had more time I think it would be important to ask more about some of Dr. Wing's studies. We talked a little bit about the methodology of the 2000 study as compared to the you know the disparities analyses. These are some of the seminal studies in the area and we have the good fortune I suppose of having them on the, you know, the particular facilities at issue here.

So sometimes when looking at whether facilities have an impact where by analogy or trying to say well something that happened somewhere else how does it affect here, there's a you know 2006 asthma symptoms study, the 2006 race poverty and potential exposure of middle school students, 2008 air pollution and odor, 2013 air pollution ISOs and blood pressure. Some of this was really path breaking community based participatory research. I also thought it could be helpful to get if you had any questions about the scope of Dr. Wing's expertise, you know to some degree the CV speaks for itself but I want to make – you know if time permitted I would want to make sure that if you had any questions that would be in the record.

But let me – let me just start with a couple of things that we didn't touch on at all that might not be as self-evident. We talked about exhibit 2 which is the letter to Christine Lawson from December 2013 and Steve you asked about in that letter asked for the permitted (inaudible) to create records to document environmental and health impact. Was there – there was a large question about did you get any response at all but do you know are there more records available now? Was there any response to that particular request? What happened with that and why did you focus on it?

Steve Wing: I'm not aware that there have been any changes in the availability of records. At the time I was particularly looking for information on daily spraying, times and amounts of the application of liquid manure broadcast into the air in hopes that we might be able to use that information in our studies. But

unfortunately I haven't been in a position to follow up on that.

Marianne Engelman Lado: We talked a little bit earlier about I think the whole – this interview started with why did you focus on swine and you mentioned the historical origins. Can you share – I guess I have two questions about the relationship between swine and poultry just to make sure this is discussed explicitly. One is the different geographic location of swine and poultry even as the poultry industry has expanded. So that's my first question.

Can you describe why we don't have perfect information about dry litter facilities for starters but also to the extent we know where those facilities are located, to what degree they're co-located and to what degree they're in different places. And then I want to talk – ask a little bit about cumulative impacts in co-location.

Steve Wing: Well, because the turkey and chicken facilities, the broiler facilities, are not permitted by the department of environment we don't have records of their locations. My understanding is that this goes back in part to post 9/11 rules that supposedly protect these facilities' locations because of concerns from bio terrorism, but I'm not able to rehearse in detail the rationale. But in any case we don't have latitude, longitude coordinates for the poultry facilities except for those few that use liquid waste management systems and therefore trigger the DEQ permitting.

On their geographic location, just by county or by some remote imaging work that's being done, there are – there is a concentration in eastern North Carolina which includes the two top turkey-dense counties in the nation which are also in the top hog-dense counties in the nation, so there's clearly co-location. But there's also another area of fairly intense poultry production in the western Piedmont of the state in rural areas between the Research Triangle and Charlotte and north and south of that line and these are dry litter operations again, they're not liquid waste facilities. I think where they are co-located, where the swine and poultry facilities are co-located, they definitely have a potential for a cumulative impact because it means that there can be animal waste in the air blown from more directions.

And the poultry waste is actually harder to track as far as its spatial impact because being dry it can be transported some distance before it's applied to land. And it's that land application process that results in the most acute release of particles because the dry litter is broadcast from manure spreaders, but it doesn't necessarily occur at the site of the CAFO, at the site of the buildings. So there is, that's another issue that makes for complexity in conducting research on the spatial pattern of the impact.

Marianne Engelman Lado: Is there – speaking as an epidemiologist or from your experience, is there any way of taking account of the cumulative impact of poultry? If you were looking at the impact of these hog facilities in eastern North Carolina is there a way you could take account of the cumulative impact or you know assess multiple exposures and/or assess also other indicators of vulnerability in the population?

Steve Wing: Yes. In fact this is the subject of a grant application that we submitted to NIEHS in which we proposed to collect particles in people's neighborhoods where they live both swine and poultry and to analyze genetic markers in the particle samples for DNA from bacteria that only live in the gut of swine and other bacteria that only live in the guts of poultry so that we could partition the particle mass present in the neighborhood into the proportion that comes from swine versus poultry. And then look at the impacts on people's health and quality of life when only swine is present, when only poultry is present and when they are both present together compared to when neither are present.

So we actually have proposed a method to do just what you asked about. Unfortunately that proposal, I have to say, was not funded. I submitted it around the same time that I wrote the letter to Christine Lawson. And sometimes I fear that there may be a connection between my having violated one of their rules and the fate of our proposal but I don't have any evidence of that.

Marianne Engelman Lado: In the absence of that new research, is there – it doesn't have to be a, you know, I think what you've called a cookbook method of the assessing multiple exposures but how would you take that into account or could you

take cumulative impacts or …

Steve Wing: Well one thing I would do is I would refer to testimony from residents which I think in my experience much of our formal research has validated what people have reported about their experiences. So we began – I began all this research being informed by the testimony of residents. And one of the things I paid attention to was that the stories people told, the accounts of their experiences were similar between people in different places that don't know each other which suggested to me that they weren't making it up. And there's plenty of testimony about the experience of living near both swine and poultry and I would begin there.

Marianne Engelman Lado: Elizabeth, do you have any questions you want to ask? I want to make sure we are able to wrap up?

Elizabeth Haddix: No, I think that does it. Thank you so much Steve.

Mary O'Lone: Anybody else have any last words, Marianne or Dr. Wing?

Marianne Engelman Lado: Well my – this is Marianne and you know thank you to Dr. Wing. And we will try to collect information and there were a few things that came up during the course of the conversation and we'll try to get that. And if you have any additional questions Mary and Jeryl and others you know feel free to let me know.

Mary O'Lone: Yes. And once again Dr. Wing, thank you very much for your time and …

Steve Wing: You're welcome. This is something that I believe is very important. I think your investigation holds out some hope for many thousands of people who are living with this pollution and we look forward to the outcome of your investigation.

Marianne Engelman Lado: Can I suggest one more question and this is for Steve. I'm aware that this was a complaint that you as a researcher and as a board member of North Carolina Environmental Justice network thought should be brought. Could you share with the Office of Civil Rights why you thought it was important to bring it?

Steve Wing: To bring a complaint?

Marianne Engelman Lado: Yes.

Steve Wing: Well, I feel that as I understand the history, that Title VI has been used in the past to address disparities in access to hospitals and schools and public transportation and other public facilities. And therefore there's a track record of bringing about some advancement of the persistent racial inequalities that exist in the United States through this law. But we haven't seen it impact the environment and we still have serious issues with environmental racism, environmental inequality.

And I think often it's very difficult for in the case where the pollution comes from corporate entities, it's very difficult to get them to change directly. But the appropriate – one appropriate way to bring about change is when there is a state agency that actually is responsible for setting the guidelines for these polluters. And it's not just about one facility at a time that might violate the Clean Water Act or the clean – or some other rule. It's about the system and permitting.

And in this case as I tried to explain earlier, I don't think we would have this system in North Carolina were it not for the presence of the black belt and its historical exploitation and lack of political and economic resources and its history of racial intimidation. So I think it's a very appropriate approach and it deals with fundamental issues of responsibility and holding our government accountable to democratic principles.

Marianne Engelman Lado: Thanks.

Mary O'Lone: Thank you. OK, all right well thank you very much again Dr. Wing.

Steve Wing: You're welcome. I'm happy to answer further questions if they come up later.

Mary O'Lone: Great. Thank you so much. Is that it?

Steve Wing: You're welcome and bye, bye.

Mary O'Lone: All right bye, bye. Thank you.

END

Studies Related to Swine CAFOs (* indicates apparent NC focus)

Studies submitted as Exhibits

*Marion Deerhake et al., *Atmospheric Dispersion and Deposition of Ammonia Gas*, *in* RTI Int'l, Benefits of Adopting Environmentally Superior Swine Waste Management Technologies in North Carolina: An Environmental and Economic Assessment, at 2-32 to 2-34 (2003), *available at* http://www.cals.ncsu.edu/waste_mgt/smithfield_projects/phase1report04/appendix%20c-RTI.pdf, attached as **Exhibit 47** (modeling rates of ammonia deposition by county). "The greatest deposition occurs in Sampson and Duplin counties." *Id.* at 2-33.

*Maria C. Mirabelli et al., *Asthma Symptoms Among Adolescents Who Attend Public Schools That Are Located Near Confined Swine Feeding Operations*, 118 Pediatrics e66 (2006), attached as **Exhibit 42** (finding students aged 12 to 14 who attended North Carolina public schools within 3 miles of industrial swine facilities reported increased asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits compared to peers at other schools).

*Maria C. Mirabelli et al., *Race, Poverty, and Potential Exposure of Middle-School Students to Air Emissions from Confined Swine Feeding Operations*, 114 Envtl. Health Perspectives 591, 595 (2006), attached as **Exhibit 43** (finding that North Carolina's swine facilities are located closer to schools enrolling higher percentages of non-white and economically disadvantaged students).

*Leah Schinasi et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 Epidemiology 208, 208 (2011), attached as **Exhibit 48** (measuring pollutants levels and effect on 101 adults living near hog CAFOs in 16 eastern North Carolina communities).

*Sacoby M. Wilson & Marc L. Serre, *Examination of Atmospheric Ammonia Levels Near Hog CAFOs, Homes, and Schools in Eastern North Carolina*, 41 Atmospheric Env't 4977, 4985 (2007), attached as **Exhibit 49**.

*Steve Wing et al., *Air Pollution and Odor in Communities Near Industrial Swine Operations*, 116 Envtl. Health Perspectives 1362 (2008), attached as **Exhibit 50** (study participants living within 1.5 miles of swine factory farm reported altering or ceasing normal daily activities when hydrogen sulfide concentrations, and associated hog odor, were the highest) [Wing, *Air Pollution and Odor*].

*Steve Wing et al., *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 121 Envtl. Health Perspectives 92 (2013), attached as **Exhibit 51**.

*Steve Wing & Jill Johnston, Dep't of Epidemiology, Univ. of N.C. at Chapel Hill, *Industrial Hog Operations in North Carolina Disproportionately Impact*

People of Color (2014) attached as **Exhibit 4.**
*M.E. Anderson & M.D. Sobsey, *Detection and Occurrence of Antimicrobially Resistant* E. coli *in Groundwater on or near Swine Farms in Eastern North Carolina*, 54 Water Sci. & Tech. 211, 217 (2006), attached as **Exhibit 37** ("Overall, the results of this study demonstrated that antibiotic-resistant E. coli were present in groundwaters associated with commercial swine farms that have anaerobic lagoons and land application systems for swine waste management.").

*Wendee Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 Envtl. Health Perspectives A182, A186 (2013), attached as **Exhibit 44** ("Even without spills, ammonia and nitrates may seep into groundwater, especially in the coastal plain where the water table is near the surface.").

*Steve Wing & Jill Johnston, Dep't of Epidemiology, Univ. of N.C. at Chapel Hill, *Industrial Hog Operations in North Carolina Disproportionately Impact People of Color* (2014) attached as **Exhibit 4.**

*Steve Wing et al., *Environmental Injustice in North Carolina's Hog Industry*, 108 Envtl. Health Perspectives 225, 228 (2000), attached as **Exhibit 52** [Wing, *Environmental Injustice*]. (finding that North Carolina's intensive hog confinement operations are located disproportionately in communities with higher levels of poverty, higher proportions of non-white persons, and higher dependence on wells for household water supply).

*JoAnn M. Burkholder et al., *Impacts of Waste from CAFOs on Water Quality*, 115 Envtl. Health Perspectives 308, 309 (2007), *available at* http://dx.doi.org/10.1289/ehp.8839, attached as **Exhibit 3 to** Ex. 6 - Personal Privacy **Declaration.**

Dana Cole et al., *Concentrated Swine Feeding Operations and Public Health: A Review of Occupational and Community Health Effects*, 108 Envtl. Health Perspectives 685 (2000), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1638284/pdf/envhper00309-0041.pdf, attached as **Exhibit 39.**

Carrie Hribar, Nat'l Ass'n of Local Bds. of Health, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities, Environmental Health* 4 (2010), *available at* http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf, attached as **Exhibit 40**.

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http://www.ncifap.org/_images/PCIFAPSmry.pdf, attached as **Exhibit 46** [hereinafter, Pew, Putting Meat on the Table] (describing the rise of industrial animal production in America and the effects on public health and the environment).

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B. Edwards B & AE Ladd, *Race, Poverty, Political Capacity and the Spatial Distribution of Swine Waste in North Carolina*, 1982–1997, 9 North Carolina Geogr 55–77 (2001).

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Joseph Herriges et al., *Living with Hogs in Iowa: The Impact of Livestock Facilities on Rural Residential Property Values*, 81 Land Econ. 530 (2005).

Carol J. Hodne, Iowa Policy Project, Concentrating on Clean Water: The Challenge of Concentrated Animal Feeding Operations 8 (2005), *available at* http://www.iowapolicyproject.org/2005docs/050406-cafo-fullx.pdf. 2005docs/050406-cafo-fullx.pdf (identifying "seepage from earthen manure storage structures" as typical pathway for nitrates entering groundwater).

Xander W. Huijsdens et al., *Community-Acquired MRSA and Pig-Farming*, 5 Annals Clinical Microbiol. & Antimicrobials 26 (2006) (Netherlands).

T. Khanna et al., *Methicillin Resistant* Staphylococcus aureus *Colonization in Pigs and Pig Farmers*, 128 J. Veterinary Microbiol. 298 (2008) (Canada).

Jungik Kim & Peter Goldsmith, *A Spatial Hedonic Approach to Assess the Impact of Swine Production on Residential Property Values*, 42 Envtl & Res. Econ. 509 (2009) (estimating decline in Craven County home property values on per hog basis).

Michael A. Mallin et al., Ctr. for Marine Science Research, Univ. of N.C. at Wilmington, Effect of Organic and Inorganic Nutrient Loading on Photosynthetic and Heterotrophic Plankton Communities in Blackwater Rivers (1998), *available at* http://repository.lib.ncsu.edu/dr/bitstream/1840.4/1880/1/NC-WRRI-315.pdf;

Katherine Milla et al., *Evaluating the Effect of Proximity to Hog Farms on Residential Property Values: A GIS-Based Hedonic Model Approach*, 17 URISA J. 27 (2005) (finding that values of Craven County, North Carolina homes decreased with increasing local hog populations and decreasing distances from homes to factory farms).

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Thu K. 2001. *Agriculture, the Environment, and Sources of State Ideology and Power*. Culture and Agriculture 23:1-7.

Thu K. 2003. *Industrial Agriculture, Democracy, and the Future. In: Beyond Factory Farming: Corporate Hog Barns and the Threat to Public Health, the Evironment, and Rural Communities*, (Ervin A, Holtslander C, Qualman D, Sawa R, eds). Saskatoon, Saskatchewan:Canadian Centre for Policy Alternatives.

van de Giessen AW, van Santen-Verheuvel MG, Hengeveld PD, Bosch T, Broens EM, Reusken CB. 2009. *Occurrence of Methicillin-Resistant Staphylococcus Aureus in Rats Living on Pig Farms*. Preventive Veterinary Medicine 91:270-273.

Studies not listed above but Earthjustice cited in their 2013 comments on draft Swine Permit

*Rachel Avery et al., *Odor from Industrial Hog Farming Operations and Mucosal Immune Function in Neighbors*, 59(2) Archives of Envtl. Health 101 (2004) (finding that swine odor was associated with reduced mucosal immune function among 15 adults living near industrial swine operations in North Carolina).

J.M. Ham & K.A. Baum, *Measuring Seepage from Waste Lagoons and Earthen Basins with an Overnight Water Balance Test*, 52 Am. Soc'y of Agric. And Biological Engineers 835 (2009) (introducing test capable of producing accurate seepage measurements in single overnight performance).

J.M. Ham, *Seepage losses from animal waste lagoons: A summary of a four year investigation in Kansas*, 45 Am. Soc'y of Agric. Eng'rs 983 (2002) (summarizing study performed using earlier variation of water balance method).

Other studies I came across – trying to focus on new or different NC ones

*Yelena Ogneva-Himmelberger *, Liyao Huang and Hao Xin, *CALPUFF and CAFOs: Air Pollution Modeling and Environmental Justice Analysis in the North Carolina Hog Industry,* ISPRS Int. J. Geo-Inf. 2015, 4, 150-171; doi:10.3390/ijgi4010150 (Published: 26 January 2015)

Abstract: Concentrated animal feeding operations (CAFOs) produce large amounts of animal waste, which potentially pollutes air, soil and water and affects human health if not appropriately managed. This study uses meteorological and CAFO data and applies an air pollution dispersion model (CALPUFF) to estimate ammonia concentrations at locations downwind of hog CAFOs and to evaluate the disproportionate exposure of children, elderly, whites and minorities to the pollutant. Ammonia is one of the gases emitted by swine CAFOs and could affect human health. Local indicator of spatial autocorrelation (LISA) analysis uses census block demographic data to identify hot spots where both ammonia concentrations and the number of exposed vulnerable population are high. We limit our analysis to one watershed in North Carolina and compare environmental justice issues between 2000 and 2010. Our results show that the average ammonia concentrations in hot spots for 2000 and 2010 were 2.5–3-times higher than the average concentration in the entire watershed. The number of people living in the areas where ammonia concentrations exceeded the minimal risk level was 3647 people in 2000 and 3360 people in 2010. We recommend using air pollution dispersion models in future environmental justice studies to assess the impacts of the CAFOs and to address concerns regarding the health and quality of life of vulnerable populations.

Donham KJ1, Lee JA, Thu K, Reynolds SJ., *Assessment of air quality at neighbor residences in the vicinity of swine production facilities*., J Agromedicine. 2006;11(3-4):15-24. doi: 10.1300/J096v11n03_03. http://www.ncbi.nlm.nih.gov/pubmed/19274894

Abstract: Air sampling was completed on the front lawn of 35 homes neighboring swine farms in three different regions in the Upper Midwest of the United States. One region was dominated by large scale, swine confined animal feeding operations (CAFO's) noted as swine confinement area (SCA). The second area was dominated by smaller scale operations utilizing hoop structure facilities (HA). The third area was basically devoid of livestock, dominated by row-crop production, and served as the control area (CA). The time weighted average concentrations of hydrogen sulfide (8.42 ppb) was higher ($p = 0.047$) in SCA area than the control (3.48 ppb). However, carbon dioxide (449.6 ppm), ammonia (12.78 ppb) and PM10 (42.25 microg/m3) were higher in the hoop structure area than the other areas. Swine population density, distance between the homes and swine facilities, and wind direction had an interactive effect on the average levels of ammonia ($p = 0.04$). The contaminant levels at the homes were relatively low compared to typical concentrations inside animal buildings. However, exceedences of federal recommended limits for hydrogen sulfide in outdoor air were observed in the swine CAFO area. Concentration of hydrogen sulfide exceeded the recommended limits of the ATSDR (30 ppb) for chronic exposure at two of the 12 homes in the CAFO area (17%). Average hydrogen sulfide concentration exceeded the EPA recommended community standards (0.7 ppb) in all three areas assessed (SCA, HA, and CA). As chronic exposure to hydrogen sulfide may be present in areas of production agriculture, a potential health risk may be present. Further studies to provide additional information regarding exposures to hydrogen sulfide in rural environments are warranted.

Thorne PS, Ansley AC, Perry SS. *Concentrations of bioaerosols, odors, and hydrogen sulfide inside and downwind from two types of swine livestock operations*. J Occup Environ Hyg. 2009 Apr;6(4):211-20. doi: 10.1080/15459620902729184
http://www.ncbi.nlm.nih.gov/pubmed/19177273

Abstract: Few data on in-barn and downwind concentrations of endotoxin, bioaerosols, and odors from livestock facilities are available, and no studies have compared conventional confinement operations with the more animal-friendly hoop operations. Hoops are open to the environment and use a composted bedding system rather than housing pigs on slatted floors over pits holding manure slurry as in conventional confinements. We assessed airborne toxicants upwind, in barns, and downwind and evaluated determinants of exposure. Inhalable particulate matter, endotoxin, odor threshold, hydrogen sulfide, culturable mesophilic bacteria, culturable fungi, and total airborne microbes, along with wind speed, temperature, and humidity were measured at separate midsized livestock facilities (one hoop, one confinement) in Central Iowa on 10 occasions over 2 years. Significant differences in contaminants were observed between hoops and confinement buildings and across seasons for endotoxin, odors, airborne microorganisms, and hydrogen sulfide. For hoops and confinements, respectively, geometric mean in-barn concentrations were 3250 and 3100 EU/m(3) for endotoxin; 1400 and 1910 microg/m(3) for particulates; 19.6 and 146 ppb for hydrogen sulfide; 137 and 428 dilutions for odor threshold; and 3.0 x 10(6) and 1.5 x 10(6) organisms/m(3) for total microbes. Endotoxin, odor, and culturable microorganisms exceeded recommended exposure limits. Reduced analysis of variance models for these contaminants demonstrated differences by barn type, season,

number of pigs, and, in some cases, temperature and humidity. Both types of swine operations produced high airborne concentrations of endotoxin, odor, hydrogen sulfide, bacteria, and fungi. Endotoxin and odors were found downwind at concentrations previously associated with adverse health effects.

*Christopher D. Heaney, Kevin Myers, Steve Wing, Devon Hall, Dothula Baron, Jill R. Stewart, *Source Tracking Swine Fecal Waste in Surface Water Proximal To Swine Concentrated Animal Feeding Operations*, Science of the Total Environment 511 (2015) 676-683.

Abstract: . . . For one year, surface water samples at up- and downstream sites proximal to swine CAFO lagoon waste land application sites were tested for fecal indicator bacteria (fecal coliforms, Escherichia coli and Enterococcus) and candidate swine-specific microbial source-tracking (MST) markers (Bacteroidales Pig-1-Bac, Pig-2-Bac, and Pig-Bac-2, and methanogen P23-2). Testing of 187 samples showed high fecal indicator bacteria concentrations at both up- and downstream sites. Overall, 40%, 23%, and 61% of samples exceeded state and federal recreational water quality guidelines for fecal coliforms, E. coli, and Enterococcus, respectively. Pig-1-Bac and Pig-2-Bac showed the highest specificity to swine fecal wastes and were 2.47 (95% confidence interval [CI] = 1.03, 5.94) and 2.30 times (95% CI = 0.90, 5.88) as prevalent proximal down- than proximal upstream of swine CAFOs, respectively. Pig-1-Bac and Pig-2-Bac were also 2.87 (95% CI = 1.21, 6.80) and 3.36 (95% CI = 1.34, 8.41) times as prevalent when 48 hour antecedent rainfall was greater than versus less than the mean, respectively. Results suggest diffuse and overall poor sanitary quality of surface waters where swine CAFO density is high. Pig-1-Bac and Pig-2-Bac are useful for tracking off-site conveyance of swine fecal wastes into surface waters proximal to and downstream of swine CAFOs and during rain events.

*Michael A. Mallin & Matthew R. McIver & Anna R. Robuck & Amanda Kahn Dickens, *Industrial Swine and Poultry Production Causes Chronic Nutrient and Fecal Microbial Stream Pollution,* Water Air Soil Pollut (2015) 226: 407

Abstract: . . . Chemical and biological stream water quality of a swine and poultry CAFO-rich watershed was investigated on 10 dates during 2013. Geometric mean fecal coliform counts were in the thousands at five of seven sites, especially in locations near swine waste sprayfields. Nitrate concentrations were very high and widespread throughout the watershed, with some individual samples yielding >10 mg-N/L. Ammonium concentrations were likewise high, but greatest near swine waste sprayfields, ranging up to 38 mg-N/L. Five-day biochemical oxygen demand (BOD5) concentrations exceeded 10 mg/L in 11 of 70 stream samples, reaching as high as 88 mg/L. BOD5 concentrations were significantly correlated with components of animal waste including total organic carbon, ammonium, and phosphorus, as well as the nutrient response variable chlorophyll a. The degree of nutrient and fecal contamination did not significantly differ between rainy and dry periods, indicating that surface and groundwater pollution occurs independently of stormwater runoff. This research shows that industrial-scale swine and poultry production leads to chronic pollution that is both a human health and ecosystem hazard. There are approximately 450,000 CAFOs currently operating in the USA, with the majority located in watersheds feeding major riverine and estuarine systems with known

water quality problems. Current US waste management protocols for this widespread system of livestock production fail to protect freshwater and estuarine ecosystems along the US Mid-Atlantic, Southeast and Gulf coasts, and expansion into industrializing nations will likely bring severe pollution with it.

*Michael A. Mallin, Mary Grace Lemon, Matthew R. McIver, ENVIRONMENTAL QUALITY OF WILMINGTON AND NEW HANOVER COUNTY WATERSHEDS, 2013, CMS Report 14-01, Center for Marine Science University of North Carolina Wilmington, Wilmington, N.C. 28409 (May 2014) http://www.uncw.edu/cms/aelab/

*Michael A. Mallin, Matthew R. McIver, Amanda Kahn Dickens and Anna R. Robuck, Center for Marine Sciences, *University of North Carolina Wilmington Chronic Stream Pollution in a CAFO Rich Watershed in Duplin County, NC* (2013) (in NC Studies folder)

*Harden, Stephen L., USGS Prepared in cooperation with the North Carolina Department of Environment and Natural Resources, Division of Water Resources, *Surface-Water Quality in Agricultural Watersheds of the North Carolina Coastal Plain Associated with Concentrated Animal Feeding Operations,* Scientific Investigations Report 2015–5080 (2015).

Abstract: The effects of concentrated animal feeding operations (CAFOs) on water quality were investigated at 54 agricultural stream sites throughout the North Carolina Coastal Plain during 2012 and 2013. Three general watershed land-use types were examined during the study, including 18 background watersheds with no active CAFOs (BK sites), 18 watersheds with one or more active swine CAFOs but no poultry CAFOs (SW sites), and 18 watersheds with at least one active swine CAFO and one active dry-litter poultry CAFO (SP sites). The watershed drainage areas for these 54 stream sites ranged from 1.2 to 17.5 square miles. Conventional fertilizers used for crop production are the primary source of nutrients at the BK sites. Animal-waste manures represent an additional source of nutrients at the SW and SP study sites. . . . When compared on the basis of land-use type, there was an overall measurable effect of CAFO waste manures on stream water quality for the SW and SP watershed groups. . . . On the basis of the results of this study, land applications of waste manure at swine CAFOs influenced ion and nutrient chemistry in many of the North Carolina Coastal Plain streams that were studied.

Ex. 5 - Deliberative Process

*Arun D. Shendrikar, Joette Steger, Hoke Kimball, Wayne Cornelius, Mark Yirka, Robert Bishop and Neil Joyner, *Ambient Atmospheric Ammonia Monitoring Around Hog Farm Industries in North Carolina* (date unknown – likely 2005 or 2006) (conducted by NC DEQ staff. Copy located in NC specific folder. In 1999, the Ambient Monitoring Section of Division of Air Quality (AMS-DAQ) started ammonia monitoring in the light of exponential growth of the regional hog farm industries. "There remains a merit to continue monitoring ammonia for the following reasons:
–It is a well documented fact (through open literature) that agricultural practices have affects on increased ammonia emissions into the environment.")

*Deanna L. Osmond, Dana L. K. Hoag, Al E. Luloff, Donald W. Meals and Kathy Neas, *Farmers' Use of Nutrient Management: Lessons from Watershed Case Studies*, Journal of Environmental Quality – Article, Vol. 44 No. 2, p. 382-390 (March 2015).

Abstract: Nutrient enrichment of water resources has degraded coastal waters throughout the world, including in the United States (e.g., Chesapeake Bay, Gulf of Mexico, and Neuse Estuary). Agricultural nonpoint sources have significant impacts on water resources. As a result, nutrient management planning is the primary tool recommended to reduce nutrient losses from agricultural fields. Its effectiveness requires nutrient management plans be used by farmers. There is little literature describing nutrient management decision-making. Here, two case studies are described that address this gap: (i) a synthesis of the National Institute of Food and Agriculture, the Conservation Effects Assessment Project, and (ii) field surveys from three nutrient-impaired river basins/watersheds in North Carolina (Neuse, Tar-Pamlico, and Jordan Lake drainage areas). Results indicate farmers generally did not fully apply nutrient management plans or follow basic soil test recommendations even when they had them. Farmers were found to be hesitant to apply N at university-recommended rates because they did not trust the recommendations, viewed abundant N as insurance, or used recommendations made by fertilizer dealers. Exceptions were noted when watershed education, technical support, and funding resources focused on nutrient management that included easing management demands, actively and consistently working directly with a small group of farmers, and providing significant resource allocations to fund agency personnel and cost-share funds to farmers. Without better dialogue with farmers and meaningful investment in strategies that reward farmers for taking what they perceive as risks relative to nutrient reduction, little progress in true adoption of nutrient management will be made.

Travis Lee Kleinschmidt, *Modeling hydrogen sulfide emissions: are current swine animal feeding operation regulations effective at protecting against hydrogen sulfide exposure in Iowa?* Dissertation, Univ. of Iowa, 2011. (4/25/16 Email from John Langstaff, OAR: He models a large swine CAFO using the air quality dispersion model AERMOD and graphs the estimated concentration of hydrogen sulfide of vs. distance from the CAFO. Reading his graph the concentration of hydrogen sulfide at 3 miles is about half that at 2 miles. His results should scale with the size of the CAFO, if the emissions configuration and meteorology are similar. I have attached his graph.)

To: O'Lone, Mary[o'lone.mary@epa.gov]
Cc: Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Johnson, Johahna[Johnson.Johahna@epa.gov]; Dunkins, Robin[Dunkins.Robin@epa.gov]
From: Schrock, Bill
Sent: Thur 3/24/2016 3:40:22 PM
Subject: RE: Looking for assistance with NC CAFO Title VI complaint

Mary – Thanks for the note. I did not receive the previous email so I had not looked into these papers. I have reviewed Dr. Wing's paper and it speaks more to the demographics of NC and the relationship to hog farms which is not really in my wheel house. We have forwarded it over to a group here in our office that has more expertise in these types of studies for their review. Hopefully I will receive their feedback sometime next week. I'm busy thru the middle of next week with a big meeting we are having on campus here, but after that I'm pretty wide open. I'll keep you posted on the progress of our review and maybe then we can schedule a time to meet. Thanks.

Bill Schrock
U.S. EPA
RTP, NC 27709
(919) 541-5032
(919) 541-3470 (fax)

From: O'Lone, Mary
Sent: Monday, March 21, 2016 9:14 PM
To: Schrock, Bill <Schrock.Bill@epa.gov>
Cc: Covington, Jeryl <Covington.Jeryl@epa.gov>; Farrell, Ericka <Farrell.Ericka@epa.gov>; Johnson, Johahna <Johnson.Johahna@epa.gov>
Subject: Looking for assistance with NC CAFO Title VI complaint

Bill-

Betsy Shaw provided your name as the OAR contact (again) for the Title VI complaint OCR has on the swine waste general permit that NC DENR/DEQ issued a year or so ago. The complaint was in ADR until last week—when ADR collapsed.

I don't know if this email ever made its way to you from Helena Wooden Aguilar. I haven't been able to find it in my email yet.

In any event, now that OCR is back in investigation mode, OCR will be scheduling an interview of Dr. Wing in the near future. We would like to talk with you first about his study referenced below. We would also like to talk to you about the other study & the status of the estimating methodology, but the Dr. Wing study is the more time sensitive items. If there is anyone else you think should review it, please let us know.

Would you (or the appropriate people in OAR) be able to take a look at the study in the next week or so?

I am on travel until Friday, but Ericka Farrell in OCR will contact you to set up a time we can talk.

Thanks, Mary

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: O'Lone, Mary
Sent: Wednesday, March 25, 2015 12:37 PM
To: Wooden-Aguilar, Helena <Wooden-Aguilar.Helena@epa.gov>
Cc: Dorka, Lilian <Dorka.Lilian@epa.gov>; Matthew, Dayna <Matthew.Dayna@epa.gov>
Subject: REACH email for Bill Schrock in OAQPS asking for specific assistance

Bill-

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Ave., NW

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NC Department of Environment and Natural Resources

Water Quality - Animal Facility Map

Animal Feeding Operations :: Facility Map

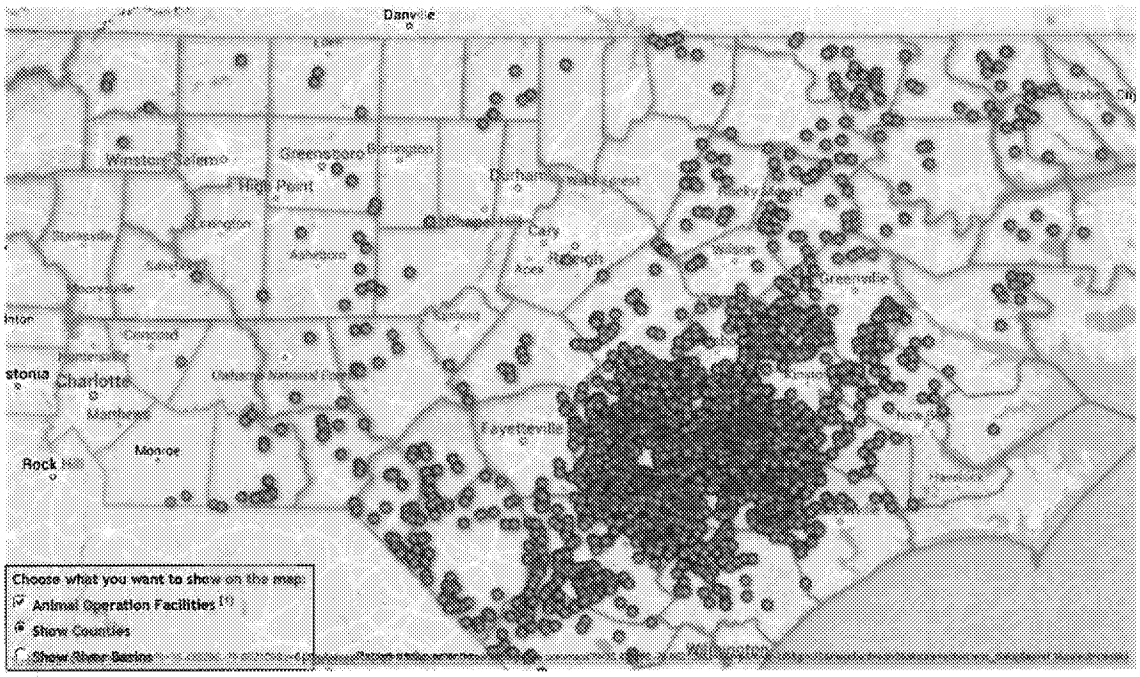
[Feedback]

What do you want to search for? OK, now select a permit type: Now click this button to search:

(http://portal.ncdenr.org/c/document_library/get_file?uuid=ff6b878a-cf47e4-8943-2d376f99fba4&groupId=38364)

Permit Type | Swine State | Search

To see more information about a facility, click on a marker: [Reset]



Hide Choices

[1] Animal Operation Facility Types

Swine State | Swine NPDES | Cattle State | Cattle NPDES

Wet Poultry NPDES | Individual NPDES | Individual State | Wet Poultry State

N.C. Department of Environment and Natural Resources

1601 Mail Service Center, Raleigh, NC 27699-1601

Headquarters (Environment and Natural Resources Building): 217 W. Jones St.

Archdale Building: 512 N. Salisbury St.

Toll Free: (877) 623-6748

To: Neal, Daria (CRT)[Daria.Neal@usdoj.gov]
Cc: Mason, Sheryl[Mason.Sheryl@epa.gov]; Harrell, Collette[Harrell.Collette@epa.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; O'Lone, Mary[o'lone.mary@epa.gov]; Packard, Elise[Packard.Elise@epa.gov]; Rhodes, Julia[Rhodes.Julia@epa.gov]; Turkevich, Paul[Turkevich.Paul@epa.gov]; Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]; Whickum, Cheryl[Whickum.Cheryl@epa.gov]; Chang, Patrick[Chang.Patrick@epa.gov]; Reeder, John[Reeder.John@epa.gov]; Fitzpatrick, Ryan (CRT)[Ryan.Fitzpatrick2@usdoj.gov]; Lareau, Alyssa (CRT)[Alyssa.Lareau@usdoj.gov]
From: Golightly-Howell, Velveta
Sent: Fri 11/7/2014 8:58:59 PM
Subject: RE: REACH, Inc. (ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ))

Appreciate your sharing the article Daria. Velveta

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Friday, November 07, 2014 3:57 PM
To: Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena; Whickum, Cheryl; Chang, Patrick; Reeder, John
Subject: RE: REACH, Inc. (ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ))

Thank you Velveta. We look forward to working with everyone and **Ex. 5 - Deliberative Process** **Ex. 5 - Deliberative Process**

By the way, I just came across this Grist article about the complaint. http://grist.org/news/giant-hog-farms-are-making-people-sick-heres-why-its-a-civil-rights-issue/

Have a good weekend.

Daria

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]
Sent: Friday, November 07, 2014 3:50 PM
To: Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena; Whickum, Cheryl; Chang, Patrick; Reeder, John
Subject: REACH, Inc. (ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ))

Hello Daria, Ryan and Alyssa. Thank you for a very informative and productive meeting this afternoon. **Ex. 5 - Deliberative Process**

Ex. 5 - Deliberative Process As agreed, we'll plan to schedule our next meeting in the early part of December. Thanks for your offer to host the meeting at your office. Enjoy your weekend everyone!

Velveta

From: Golightly-Howell, Velveta
Sent: Friday, November 07, 2014 12:09 PM
To: 'Neal, Daria (CRT)'; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena; Whickum, Cheryl
Subject: REACH, Inc. (ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ))

Hi Daria, Ryan and Alyssa. We hope that your day is going well. Here's the agenda to which we've made a few tweaks. We'll have hard copies for you. We're looking forward to seeing you at 2 p.m.

Velveta

Velveta Golightly-Howell

Director, Office of Civil Rights

Environmental Protection Agency

1200 Pennsylvania Avenue, N.W.

Mail Code 1201A

Washington, DC 20460

202-564-7272

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Thursday, November 06, 2014 5:04 PM
To: Whickum, Cheryl; Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: RE: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

Ex. 5 - Deliberative Process

1. Introductions

2. Background on Civil Rights Division's Title VI coordination work.

3. Discussion of EPA's Process (i.e. understanding the DCRO's role) and Investigation Plan

Ex. 5 - Deliberative Process

6. Schedule Next Meeting

From: Whickum, Cheryl [mailto:Whickum.Cheryl@epa.gov]
Sent: Thursday, November 06, 2014 3:57 PM
To: Neal, Daria (CRT); Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

A Warm & Hearty…

Ms. Daria:

Everything in Ms. Velveta's e-mail is correct.

And, in addition, Ms. Helena would like you to:

1) have your gov't I.D.;

2) e-mail Ms. Helena or call me at 202-564-4366 (Cheryl W). I will contact Ms. Helena who will send an escort to you.

Thank you,

Cheryl Whickum

U. S. EPA, Office of Civil Rights

Title VI - External Compliance Program

1200 Pennsylvania Ave, NW, WJC-North, Rm 2524

Mail Code: 1201A

Washington, DC 20460

202-564-4366 (Direct Line)

202-564-7272 (Office Line)

202-565-0196 (Fax Line)

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Thursday, November 06, 2014 3:30 PM
To: Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: RE: Meeting w/DOJ (req'd by DOJ)

Thank you.

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]
Sent: Thursday, November 06, 2014 3:29 PM
To: Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: Re: Meeting w/DOJ (req'd by DOJ)

You'll have to come through the main doors of the William Jefferson Clinton North Bldg., Daria, Ryan and Alyssa. When you come out of the Federal Triangle Metro, take an immediate left. You'll see the building's entrance. If you take the Metro Center Metro, you may still need to use this entrance since I'm not sure if anyone w/non-EPA badges are allowed to enter through the entrance between 12th and 13th on Pennsylvania Avenue (near the Post Office). Helena will let you know if you can. Take care.

Velveta

From: Neal, Daria (CRT) <Daria.Neal@usdoj.gov>
Sent: Thursday, November 6, 2014 3:06:11 PM
To: Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; Golightly-Howell, Velveta; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); Turkevich, Paul
Cc: Mason, Sheryl; Harrell, Collette
Subject: RE: Meeting w/DOJ (req'd by DOJ)

Which entrance should we use tomorrow?

-----Original Appointment-----
From: Whickum, Cheryl [mailto:Whickum.Cheryl@epa.gov]
Sent: Thursday, November 06, 2014 11:39 AM
To: Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; Golightly-Howell, Velveta; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); Turkevich, Paul
Cc: Mason, Sheryl; Harrell, Collette
Subject: Meeting w/DOJ (req'd by DOJ)
When: Friday, November 07, 2014 2:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: DCRoomARN2450B/DC-ARN-OCR-Rooms - (Dial In Number Ex. 6 - Personal Privacy Conference Code Ex. 6 - Personal Privacy

To: Golightly-Howell, Velveta[Golightly-Howell.Velveta@epa.gov]; Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]
Cc: Rhodes, Julia[Rhodes.Julia@epa.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]
From: O'Lone, Mary
Sent: Fri 11/7/2014 5:06:41 PM
Subject: RE: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

I would also recommend that OAR be invited as well if you are trying to get all the programs who are working on CAFO issues.

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: Golightly-Howell, Velveta
Sent: Friday, November 07, 2014 11:49 AM
To: Wooden-Aguilar, Helena
Cc: Rhodes, Julia; O'Lone, Mary; Covington, Jeryl; Farrell, Ericka
Subject: RE: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

Hi Helena. As I've let you know, the COS and/or the DCOS will attend this afternoon's meeting. Also, as I said, the DCOS is reaching out to DCROs for OW and OECA and possibly other programs to see if they can attend or send a rep. I'm modifying the agenda to incorporate your changes. Can you cover the EPA Orders? **Ex. 5 - Deliberative Process**

Ex. 5 - Deliberative Process Thanks.

Velveta

From: Wooden-Aguilar, Helena
Sent: Thursday, November 06, 2014 8:19 PM
To: Golightly-Howell, Velveta
Cc: Rhodes, Julia; O'Lone, Mary; Covington, Jeryl; Farrell, Ericka
Subject: Fwd: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

Velveta

I hope you had a safe flight. I wanted to send this quick note with my thoughts on the agenda.

Ex. 5 - Deliberative Process

Lastly, below are a few more minor thoughts.

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Helena

Helena Wooden-Aguilar

Assistant Director

External Civil Rights - US EPA

202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

Begin forwarded message:

From: "Golightly-Howell, Velveta" <Golightly-Howell.Velveta@epa.gov>

Date: November 6, 2014 at 5:49:22 PM EST
To: "Neal, Daria (CRT)" <Daria.Neal@usdoj.gov>, "Whickum, Cheryl" <Whickum.Cheryl@epa.gov>, "Fitzpatrick, Ryan (CRT)" <Ryan.Fitzpatrick2@usdoj.gov>, "Lareau, Alyssa (CRT)" <Alyssa.Lareau@usdoj.gov>
Cc: "Mason, Sheryl" <Mason.Sheryl@epa.gov>, "Harrell, Collette" <Harrell.Collette@epa.gov>, "Covington, Jeryl" <Covington.Jeryl@epa.gov>, "Farrell, Ericka" <Farrell.Ericka@epa.gov>, "O'Lone, Mary" <o'lone.mary@epa.gov>, "Packard, Elise" <Packard.Elise@epa.gov>, "Rhodes, Julia" <Rhodes.Julia@epa.gov>, "Turkevich, Paul" <Turkevich.Paul@epa.gov>, "Wooden-Aguilar, Helena" <Wooden-Aguilar.Helena@epa.gov>
Subject: Re: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

Thank you. Velveta

From: Neal, Daria (CRT) <Daria.Neal@usdoj.gov>
Sent: Thursday, November 6, 2014 5:04:12 PM
To: Whickum, Cheryl; Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: RE: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

Below is our proposed agenda for tomorrow:

1. Introductions

2. Background on Civil Rights Division's Title VI coordination work.

3. Discussion of EPA's Process (i.e. understanding the DCRO's role) and Investigation Plan

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

6. Schedule Next Meeting

From: Whickum, Cheryl [mailto:Whickum.Cheryl@epa.gov]
Sent: Thursday, November 06, 2014 3:57 PM
To: Neal, Daria (CRT); Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: ADDITIONAL RESPONSE _ Meeting w/DOJ (req'd by DOJ)

A Warm & Hearty…

Ms. Daria:

Everything in Ms. Velveta's e-mail is correct.

And, in addition, Ms. Helena would like you to:

1) have your gov't I.D.;

2) e-mail Ms. Helena or call me at 202-564-4366 (Cheryl W). I will contact Ms. Helena who will send an escort to you.

Thank you,

Cheryl Whickum

U. S. EPA, Office of Civil Rights

Title VI - External Compliance Program

1200 Pennsylvania Ave, NW, WJC-North, Rm 2524

Mail Code: 1201A

Washington, DC 20460

202-564-4366 (Direct Line)

202-564-7272 (Office Line)

202-565-0196 (Fax Line)

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Thursday, November 06, 2014 3:30 PM
To: Golightly-Howell, Velveta; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: RE: Meeting w/DOJ (req'd by DOJ)

Thank you.

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]
Sent: Thursday, November 06, 2014 3:29 PM
To: Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT)
Cc: Mason, Sheryl; Harrell, Collette; Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Turkevich, Paul; Wooden-Aguilar, Helena
Subject: Re: Meeting w/DOJ (req'd by DOJ)

You'll have to come through the main doors of the William Jefferson Clinton North Bldg., Daria, Ryan and Alyssa. When you come out of the Federal Triangle Metro, take an immediate left. You'll see the building's entrance. If you take the Metro Center Metro, you may still need to use this entrance since I'm not sure if anyone w/non-EPA badges are allowed to enter through the entrance between 12th and 13th on Pennsylvania Avenue (near the Post Office). Helena will let you know if you can. Take care.

Velveta

From: Neal, Daria (CRT) <Daria.Neal@usdoj.gov>

Sent: Thursday, November 6, 2014 3:06:11 PM
To: Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; Golightly-Howell, Velveta; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); Turkevich, Paul
Cc: Mason, Sheryl; Harrell, Collette
Subject: RE: Meeting w/DOJ (req'd by DOJ)

Which entrance should we use tomorrow?

-----Original Appointment-----
From: Whickum, Cheryl [mailto:Whickum.Cheryl@epa.gov]
Sent: Thursday, November 06, 2014 11:39 AM
To: Whickum, Cheryl; Covington, Jeryl; Farrell, Ericka; Golightly-Howell, Velveta; O'Lone, Mary; Packard, Elise; Rhodes, Julia; Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); Turkevich, Paul
Cc: Mason, Sheryl; Harrell, Collette
Subject: Meeting w/DOJ (req'd by DOJ)
When: Friday, November 07, 2014 2:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: DCRoomARN2450B/DC-ARN-OCR-Rooms - (Dial In Number: Ex. 6 - Personal Privacy Conference Code: Ex. 6 - Personal Privacy

DECLARATION OF STEVE WING

I, Steve Wing, do hereby declare as follows:

1. My full name is Steven Bennett Wing. I am of legal age and competent to give this declaration. All of the information herein is based on my own personal knowledge unless otherwise indicated.

2. From 1985 to present I have been a faculty member in the Department of Epidemiology at The University of North Carolina at Chapel Hill. I am currently an Associate Professor. A copy of my Curriculum Vitae is attached as **Exhibit 1**.

3. Since 1996 my research has focused on the impact of swine confinement facilities, also known as confined animal feeding operations ("CAFOs") or industrial hog operations ("IHOs"), and on the well-being and quality of life of neighboring residents and workers.[1-21] I reviewed much of this research in a recent book chapter.[22]

4. Before industrialization of the hog industry, most North Carolina producers raised small numbers of hogs, commonly fewer than 25, on diversified farms where hogs were one of several commercial crops, or products.[23] Swine production in North Carolina changed dramatically during the last decades of the 20th century. Between 1982 and 2006 the number of hog operations in the state declined precipitously while the hog population increased from approximately 2 to 10 million (see Wing, 2014,[22] Figure 3.3). Industrial producers in North Carolina adopted a system of raising large numbers of hogs, often many thousands, in confinement structures that exhaust toxic gases and particles into the environment. While smaller, pasture-based hog farms were spread across the state, industrial facilities became spatially concentrated in North Carolina's eastern coastal plain.[24] This low-lying region, which

has sandy soils and shallow aquifers and is vulnerable to flooding, now has the top 10 ranked counties for numbers of hogs per land area in the entire United States.[25]

5. A large hog CAFO produces as much waste as a city of 50,000 or more people, but unlike cities, has no wastewater treatment plant. Instead, animal wastes are flushed into open cesspools and then sprayed on nearby fields (see Wing, 2014,[22] Figure 3.1). Industrial-scale animal waste sprayers capable of dispersing hundreds of gallons of waste per minute create mists that can easily drift downwind into neighboring communities (see Wing, 2014,[22] Figure 3.2). Hog CAFOs emit gases and particles from confinements, open cesspools, sprayfields, and bins of rotting carcasses that are stored on site prior to disposal.

6. Airborne emissions from hog CAFOs have demonstrated impacts on the health and quality of life of neighbors.[2,22,26,27]

7. Air pollution from hog CAFOs harms human health. Particles less than 10 microns in aerodynamic diameter (PM_{10}), including endotoxins, bacteria, yeasts and molds that are recognized toxins and inflammatory mediators,[28] can be inhaled deep into the respiratory tract. Hog CAFO gases can affect both the upper and lower respiratory tract. Hydrogen sulfide, a toxic compound produced by anaerobic decomposition of hog waste, travels off-site through the air to nearby communities, and is a useful marker of complex mixtures of gases and particles emitted by hog CAFOs.[29] Ammonia, which can irritate the eyes and mucous membranes, is also released by hog CAFOs. Humans absorb gaseous ammonia in the upper respiratory tract. When transformed into fine particles in the presence of humidity, ammonia can reach deeper into the lungs.[1,30]

8. Hog CAFOs emit a large number of volatile organic compounds that contribute to the offensive odors described by neighbors. These compounds may occur as gases or may be

adsorbed to fine particles. When fine particles are inhaled and settle onto the warm, moist mucous membranes of nose, they release odorant compounds that are detected by the olfactory nerves.[1,30] Airborne emissions from hog CAFO have pronounced impacts on the health and quality of life of neighbors.

9. The negative impacts of particles and gases inside swine confinements on worker health are well-documented.[1,31-38] A 2010 review notes that respiratory effects include "symptoms of acute and chronic bronchitis, nonallergic occupational asthma, mucous membrane irritation, and organic dust toxic syndrome."[28] These effects have been observed repeatedly in research in different countries with different study designs despite the healthy worker effect, a well-known phenomenon in occupational epidemiology. The healthy worker effect refers to the observation that workers tend to be healthier than the general population, which includes people too sick to work and people who are sensitive to hazards in the workplace.[39] Confinement workers are exposed to higher concentrations of particles, gases and microbes than are CAFO neighbors, however, communities near CAFOs include children, the elderly, people who are too sensitive to CAFO dusts and gases to work there, and people with chronic respiratory disease. Furthermore, nearby communities are exposed involuntarily to hog CAFO pollutants in and around their homes where they have expectations to beneficial use of their property and freedom from substances that cause physical discomfort, annoyance, stress and anxiety.

10. An extensive body of peer-reviewed scientific evidence shows that hog CAFOs contaminate the air in neighboring communities where they affect the health and quality of life of neighbors.[2,31,40-49] There are some differences in the way North Carolina hog CAFOs operate compared to CAFOs in some areas. For example, in Iowa, hog waste is usually stored in pits under the confinements, whereas in North Carolina hog waste is typically stored in open-air

ponds known to the industry as "lagoons." Although studies of community impacts of hog CAFOs in other parts of the U.S.A. and Europe are relevant to the situation in North Carolina, in the following paragraphs I focus on studies conducted in North Carolina by our research group, including university faculty members, doctoral student research assistants, university research staff, members of community-based organizations, and government scientists.

11. With support from the North Carolina Department of Health and Human Services and the National Institute of Environmental Health Sciences, our research group conducted a survey of health and quality of life of residents of three eastern North Carolina communities with similar demographic and economic characteristics.[21] In one community, residents lived within two miles of a hog CAFO. One of the comparison areas had two cattle operations, and the other had no industrial livestock facilities. Residents living near the hog CAFO reported higher frequencies of headache, runny nose, sore throat, coughing, diarrhea, and burning eyes compared to residents of the community with no industrial livestock production. To evaluate quality of life we asked participants how often in the past six months they were unable to open their windows or go outside even in nice weather. Hog CAFO neighbors reported an average of 18.5 days in the past six months when they couldn't open their windows, and 15.4 days when they couldn't go outside, compared to 3.2 and 2.1 days, respectively in the community with no livestock production.[21] Our research was published in *Environmental Health Perspectives*, the peer-reviewed scientific journal of the National Institute of Environmental Health Sciences, National Institutes of Health, United States Department of Health and Human Services.

12. During the 1999-2000 school year, the North Carolina Department of Health and Human Services conducted a survey of respiratory symptoms, asthma diagnoses and asthma treatment among public middle school students across the State. Because this survey did not

include an evaluation of environmental exposures that could affect children's respiratory heath, we sent a questionnaire to rural school staff to assess environmental exposures including the frequency of occurrence of livestock odors at the schools. Because respiratory irritants and allergens are present in air emissions from hog and poultry CAFOs, we hypothesized that asthma symptoms would be more prevalent among children who attended schools affected by livestock air pollution. We found that children who attended schools where staff reported noticing livestock odor inside school buildings twice or more per month had a 23% higher prevalence of wheezing symptoms compared to children who attended schools where no livestock odor was reported. Children attending schools within three miles of a hog CAFO had more asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits compared to students who attended schools further away.[6] *Pediatrics*, the peer-reviewed journal of the American Academy of Pediatrics, published our findings.

13. From 2003 until 2005 our research group conducted a repeated-measures study of air pollution, health and quality of life in 16 neighborhoods in eastern North Carolina. The neighborhoods, located in three different counties, were located within 1.5 miles of between one and 16 hog CAFOs. For two to three weeks, we monitored concentrations of PM_{10} and hydrogen sulfide at a central location in each neighborhood (see Wing, 2014,[22] Figure 3.10). While we monitored air pollution, adult non-smokers living around the monitors participated in a study of health and quality of life. Participants had their odor sensitivity tested and chose times each morning and evening when they agreed to sit on their porch for 10 minutes to be exposed to the ambient air. For two to three weeks, twice a day, they used a structured diary to rate the strength of hog odor from none to very strong, rate their experience of irritation of the eyes, nose and respiratory symptoms, report disruption of routine activities of daily living, measure their lung

function, and measure their blood pressure (see Wing, 2014,[22] Figure 3.9). One hundred and one study participants produced over 2,900 journal entries. This study was designed to evaluate the acute effects of hog CAFO air pollution on neighbors. Rather than comparing exposed communities to unexposed communities in another location, we compared participants' symptoms, quality of life, lung function and blood pressure at times when they were exposed and times when they were unexposed. Thus, each person served as her or his own control. Unlike comparisons between exposed and unexposed communities which can be affected by differences between groups in medical history, diet, weight, occupational exposure, housing and other attributes, these other potential influences on health are essentially the same for a person for the two to three weeks of the study when they experienced time periods of higher vs. lower hog CAFO pollution. This design allowed us to determine whether exposures preceded the outcomes of interest and ensured that health differences between exposed and unexposed time periods were not due to typical so-called "confounding factors." The disadvantage of this design is that people were not in the study long enough to be able to examine the chronic effects of long-term exposures.[18]

14. Study participants reported hog odor outside their homes on more than half of days in the study and inside their homes on 12.5% of days.[29] Reported hog odor and measured hydrogen sulfide concentrations were highest in the mornings and evenings – times when people commonly like to engage in outdoor activities at home (see Wing, 2014,[22] Figure 3.11).[29] Participant reports of hog odor were strongly related to ambient concentrations of hydrogen sulfide, and to levels of fine particles at higher wind speeds (particles travel further in the wind than when the air is still).[29] The correspondence between participants' hog odor ratings and pollutant concentrations measured by air monitors provides objective validation of participants'

odor ratings. Indeed, the relationship between odor and hydrogen sulfide in our study corresponds closely to results of a chamber experiment in which participants were exposed to CAFO air.[48]

15. During the two-to-three weeks of the study, approximately one-third of participants reported cancelling or changing daily activities due to hog odor. As we explained in our paper published by *Environmental Health Perspectives*, "[t]ypical changes included closing windows, avoiding sitting in the yard and socializing with friends, cancelling plans to barbecue, not putting clothes out to dry, declining exercise via outdoor walks, not putting up Christmas lights, not being able to garden or mow the lawn, not washing the car, or not being able to sit on the porch."[29] Participants reported cancelling or changing their daily activities 11.3 times more often when average odor in the past 12 hours was rated as 5 or greater on the 0-8 scale compared to times when average odor was less than 1. Hog CAFO odors were highly disruptive of daily activities in this population despite the fact that three-quarters of participants indicated they grew up on a farm where they had experience with livestock odors.[29]

16. There is considerable evidence documenting the impact of malodor on annoyance.[4] In the case of odors from hog CAFOs, a broad range of mood impacts has been of interest. Authors of the first published study of impacts of hog CAFO odor on North Carolina residents concluded that, "[p]ersons living near the intensive swine operations who experienced the odors reported significantly more tension, more depression, more anger, less vigor, more fatigue, and more confusion than control subjects."[47]

17. As part of the repeated-measures study described in paragraph 13 above, our research group evaluated hog odor and measured pollutants as triggers of stress and negative mood.[4] Participants reported feeling more stressed or annoyed, nervous or anxious, gloomy or

unhappy, angry or grouchy, and confused or unable to concentrate, during times when hog odors were stronger. Participants also reported higher levels of stress and annoyance during times when air pollution monitoring instruments showed that concentrations of hydrogen sulfide and semi-volatile PM_{10} were higher in their neighborhoods.[4] The *American Journal of Public Health*, the peer-reviewed scientific journal of the American Public Health Association, published these findings.

18. Odorant chemicals have physiological as well as psychological effects in humans. Most people have experienced salivation in response to the pleasant smell of good food. Malodor also has physiological effects. Participants in the study described in paragraph 13 above measured their blood pressure after sitting outdoors for 10 minutes. To limit the possibility of errors in recording blood pressure values, each participant printed their blood pressure readings with a time stamp and pasted the print-outs in their diaries. Participants' diastolic blood pressures were higher at times when they reported stronger hog odor outside their homes than when there was less odor (see Wing, 2014,[22] Figure 3.12). Their systolic blood pressures rose with the concentrations of hydrogen sulfide, measured in a central location in their neighborhoods at the time they sat outside.[19] In addition to providing an objective measure of people's physiological response to odorant compounds that cause annoyance, physical symptoms, and disruption of daily activities, repeated acute elevations of blood pressure are a medical concern due to their potential to contribute to chronic hypertension.[19] The peer-reviewed scientific journal *Environmental Health Perspectives* published these findings.

19. Consistent with well-documented effects of ammonia, PM_{10}, and volatile organic compounds, as well as prior reports of human impacts of air pollution from hog CAFOs, participants in the repeated-measures study described in paragraph 13 experienced physical as

well as mental discomfort in the presence of hog CAFO air pollution. After sitting outside for 10 minutes at their selected morning and evening times, participants reported more irritation of the eyes, nose, throat, skin and more coughing when hog odor was stronger compared to when it was weaker or absent.[9] Eye irritation was related to concentrations of hydrogen sulfide and PM_{10}. One or more respiratory symptoms were related to hydrogen sulfide, components of PM_{10}, endotoxin, and odor. A measure of lung function, forced expiratory volume in one second, which participants took following their ten-minute outdoor exposure, declined with increasing average concentrations of fine particles ($PM_{2.5}$) in the past 12 hours.[9] These physical effects of exposure to airborne emissions from hog CAFOs help explain the stress, annoyance, and inconveniences experienced by hog CAFO neighbors. *Epidemiology*, the peer-reviewed journal of the International Society for Environmental Epidemiology, published these findings.

20. Research based on qualitative interviews can help elucidate the influence of social factors in environmental health research.[50] Our research team therefore designed a study using in-depth interviews. After completing the repeated-measures study described in paragraph 13, 42 participants and seven other volunteers from the same neighborhoods participated in semi-structured interviews designed to obtain information about how odor from the hog CAFOs in their neighborhoods affected their enjoyment of life and beneficial use of property. The interviews were recorded and transcribed, and codes were assigned to participants' responses.[12]

21. Our study found that hog CAFO odor impacts neighbors' ability to engage in activities they enjoy the most and that they expect to be able to do inside and outside their homes. These include "cookouts, barbequing, family reunions, socializing with neighbors, gardening, working outside, playing, drying laundry outside, opening doors and windows for fresh air and to conserve energy, use of well water, and growing vegetables." We concluded that

"[t]he types of activities that are restricted by hog odor are social interactions, physical activities, energy- and cost-saving activities, relaxing outside or indoors, and sleeping." We further noted that restriction of these activities is important because they "have been shown to positively affect health, improve overall well-being, reduce stress, and strengthen social networks."[12] The peer-reviewed journal, *New Solutions: A Journal of Environmental and Occupational Health Policy*, whose editorial office is at the University of Massachusetts, Lowell, published our findings.

22. Liquid contaminants from hog CAFOs are released to the environment through leakage from animal waste pits, runoff from land application of liquid wastes, atmospheric deposition (e.g. through rainfall), and failure of the earthen walls of waste pits.[51] Parasites, bacteria, viruses, nitrates, and other components of liquid hog CAFO waste pose threats to human health.[1]

23. In 2010 we conducted a study of fecal contamination of streams in an area of eastern North Carolina with a high density of hog CAFOs.[3] In many samples we found elevated levels of fecal indicator bacteria that are routinely used for public health protection. However presence of these organisms does not indicate whether the fecal contamination comes from livestock, wild animals, domestic pets, or humans. To determine whether fecal contamination of these streams could be traced to nearby hog CAFOs, we evaluated several candidate microbial source tracking markers. Microbial source tracking markers use DNA from microorganisms that have become adapted to the gastrointestinal tracts of particular species of animals, making them useful for identifying the type of animal that is responsible for fecal contamination. We found that two candidate markers, fecal *Bacteroidales* Pig-1-Bac and Pig-2-Bac, were present in 80% and 87%, respectively, of hog waste and wallow water samples, but were absent in chicken, turkey, goat, horse, cow, and human fecal samples. We found Pig-1-Bac and Pig-2-Bac to be

more prevalent in samples taken downstream compared to upstream locations near hog CAFOs, and we found that their prevalence increased following rain events that can transport fecal waste from hog CAFO sprayfields into streams. This study provides direct evidence that hog CAFOs contaminate nearby streams during routine operations. *Science of the Total Environment*, an international peer-reviewed journal for scientific research into the environment and its relationship with humankind, published this research.

24. Routine air and water pollution from hog CAFOs can be contrasted with pollution that occurs following storms. Overflow of waste pits during heavy rain events results in massive spills of animal waste into neighboring communities and waterways (see Wing, 2014,[22] Figures 3.6 and 3.7). For example, our research group identified 237 hog CAFOs with permit coordinates that were located in flooded areas identified from satellite imagery taken approximately one week after Hurricane Floyd hit eastern North Carolina in September, 1999 (see Wing, 2014,[22] Figure 3.8).[16] These findings were published in *Environmental Health Perspectives*.

25. North Carolina state-issued operating permits require hog CAFOs to maintain adequate freeboard in their fecal waste pits to protect the pits from overflowing during times of heavy rains or increased production of waste. Freeboard is the space between the liquid waste and the top of the earthen containment wall. However, the permit requirement to maintain freeboard sometimes conflicts with the permit requirements that hog CAFOs apply waste at agronomic rates and that they refrain from land application during rain or when the ground is frozen and unable to absorb waste. Over-spraying of waste can contaminate ground and surface water near hog CAFOs. The North Carolina Department of Environment and Natural Resources has, in the past, temporarily waived prohibitions against non-agronomic land application to allow

hog CAFOs to protect their freeboard. The Department does not have adequate personnel and other resources to surveil the thousands of sprayfields they have permitted, many of which are not visible from state roads, to evaluate how often non-agronomic land application occurs. Off-site dispersion of liquid wastes from fecal waste pits and sprayfields through routine leakage of waste pits, over-application, and storm events, threatens water quality of hog CAFO neighbors.

26. Extensive evidence shows that North Carolina hog CAFOs release toxic air and water pollution into surrounding neighborhoods where it directly impacts the health and well-being of neighbors. The affected communities are disproportionately composed of low-income people of color who have fewer protections from environmental hazards, less ability to leave their homes during high exposure periods, and less access to medical and clinical services than residents of higher income communities; these factors increase their vulnerability to the harmful impacts of hog CAFO emissions.[15,52] This evidence is consistent with evaluations of CAFO impacts in other locations[26] and understanding of the increased vulnerability of low-income populations to environmental hazards.

[Signature page to follow]

I declare under the penalty of perjury that the foregoing is true and correct.

EXECUTED this 21 day of October, 2015 in Chapel Hill, North Carolina.

Steve Wing

Steve Wing

CITATIONS

1. Cole D, Todd L, Wing S. Concentrated Swine Feeding Operations and Public Health: A Review of Occupational and Community Health Effects. Environ Health Perspec 2000;108:685-99.
2. Donham KJ, Wing S, Osterberg D, et al. Community health and socioeconomic issues surrounding concentrated animal feeding operations. Environ Health Perspect 2007;115:317-20.
3. Heaney CD, Myers K, Wing S, Hall D, Baron D, Stewart JR. Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. The Science of the total environment 2015;511:676-83.
4. Horton RA, Wing S, Marshall SW, Brownley KA. Malodor as a trigger of stress and negative mood in neighbors of industrial hog operations. American journal of public health 2009;99 Suppl 3:S610-5.
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11. Schinasi L, Wing S, Augustino KL, et al. A case control study of environmental and occupational exposures associated with methicillin resistant Staphylococcus aureus nasal carriage in patients admitted to a rural tertiary care hospital in a high density swine region. Environmental health: a global access science source 2014;13:54.
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15. Wing S, Cole D, Grant G. Environmental injustice in North Carolina's hog industry. Environ Health Perspect 2000;108:225-31.
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17. Wing S, Grant G, Green M, Stewart C. Community based collaboration for environmental justice: South-east Halifax environmental reawakening. Environment and Urbanization 1996;8:129-40.
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19. Wing S, Horton RA, Rose KM. Air pollution from industrial swine operations and blood pressure of neighboring residents. Environ Health Perspect 2013;121:92-6.
20. Wing S, Lowman A, Keil A, Marshall SW. Odors from sewage sludge and livestock: associations with self-reported health. Public Health Rep 2014;129:505-15.
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Industrial Hog Operations in North Carolina
Disproportionately Impact African-Americans, Hispanics and American Indians

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Summary

Background: In 2014, the North Carolina Department of Environment and Natural Resources (NC-DENR) issued a swine waste management general permit (the General Permit), which is expected to cover more than 2,000 industrial hog operations (IHOs). These facilities house animals in confinement, store their feces and urine in open pits, and apply the waste to surrounding fields. Air pollutants from the routine operation of confinement houses, cesspools, and waste sprayers affect nearby neighborhoods where they cause disruption of activities of daily living, stress, anxiety, mucous membrane irritation, respiratory conditions, reduced lung function, and acute blood pressure elevation. Prior studies showed that this industry disproportionately impacts people of color in NC, mostly African Americans.

Methods: We obtained records on the sizes and locations of permitted IHOs from NC-DENR and calculated the steady state live weight (SSLW) of hogs as an indicator of the amount of feces and urine produced at each IHO. We obtained block-level information on race and ethnicity from the 2010 census of the United States. We compared the proportions of people of color (POC), Blacks, Hispanics, and American Indians living within 3 miles of an IHO to the proportion of non-Hispanic Whites. We quantified relationships between race/ethnicity, presence of one or more IHOs, and the SSLW of IHOs, using Poisson regression and linear regression to adjust for rurality.

Results: Analyses based on a study area that excludes the state's five major cities and western counties that have no presence of this industry show that the proportion of POC living within 3 miles of an industrial hog operation is 1.52 times higher than the proportion of non-Hispanic Whites. The proportions of Blacks, Hispanics and American Indians living within 3 miles of an industrial hog operation are 1.54, 1.39 and 2.18 times higher, respectively, than the proportion of non-Hispanic Whites ($p<0.0001$). In census blocks with 80 or more percent people of color, the proportion of the population living within 3 miles of an industrial hog operation is 2.14 times higher than in blocks with no people of color. This excess increases to 3.30 times higher with adjustment for rurality. Adjusted for rurality, the SSLW of hogs within 3 miles of a census block increases, on average, 100,000, 64,000, 243,000, and 93,000 pounds for every 10 percent increase in POC, Black, Hispanic, and American Indian population ($p<0.0001$).

Conclusions: IHOs in NC disproportionately affect Black, Hispanic and American Indian residents. Although we did not examine poverty or wealth in this study, the results are consistent with previous research showing that NC's IHOs are relatively absent from low-poverty White communities. This spatial pattern is generally recognized as environmental racism.

Background

Swine production in North Carolina (NC) changed dramatically during the last decades of the 20th century. Between 1982 and 2006 the number of hog operations in the state declined precipitously while the hog population increased from approximately 2 to 10 million (Edwards and Driscoll 2009). Production became concentrated in eastern NC (Furuseth 1997).

Traditional NC producers raised small numbers of hogs, commonly fewer than 25, and hogs were one of several commercial crops on diversified farms (Edwards and Driscoll 2009). In contrast, industrial producers raise large numbers of hogs, often many thousands, in confinement houses that are designed to vent toxic gases and particles into the environment. Animal wastes are flushed into open cesspools and then sprayed on nearby fields. Pollutants emitted by IHOs include hydrogen sulfide, ammonia, a wide array of volatile organic compounds, and bioaerosols including endotoxins and other respiratory irritants (Cole et al. 2000) (Schiffman et al. 2001).

The negative impacts of particles and gases inside IHO confinements on worker health have been extensively described (Cole et al. 2000; Donham 1993; Donham et al. 1995; Donham et al. 2000; Donham 1990). Environmental pollutants from IHOs affect people who are more susceptible than workers due to young or old age, asthma or allergies, or other conditions. An extensive body of peer-reviewed scientific evidence shows that IHOs release contaminants into neighboring communities where they affect the health and quality of life of neighbors. Many of these studies have been conducted in NC. Hydrogen sulfide concentrations within 1.5 miles of IHOs in NC are associated with neighbors' ratings of hog odor and inability to engage in routine daily activities (Wing et al. 2008), increased stress and anxiety (Horton et al. 2009), irritation of the eyes, nose and throat, respiratory symptoms (Schinasi et al. 2011), and acute elevation of systolic blood pressure (Wing et al. 2013). A study of NC public middle school children who participated in an asthma survey, which was conducted by the NC Department of Health and Human Services, found that children attending schools within three miles of an IHO had more asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits than students who attended schools further away (Mirabelli et al. 2006). The same study reported a 23% higher prevalence of wheezing symptoms among children who attended schools where staff reported noticing livestock odor inside school buildings twice or more per month compared to children who attended schools where no livestock odor was reported (Mirabelli et al. 2006). Other studies in NC (Tajik et al. 2008) (Wing and Wolf 2000) (Bullers 2005) (Schiffman et al. 1995) and elsewhere (Donham et al. 2007) (Thu et al. 1997) (Radon et al. 2007) also document negative impacts of IHO air pollution on neighbors' health and quality of life.

Liquid contaminants from IHOs are released to the environment through leakage of animal waste storage pits, runoff from land application of liquid wastes, atmospheric deposition, and failure of the earthen walls of waste pits (Burkholder et al. 2007). Overflow of waste pits during heavy rain events results in massive spills of animal waste into neighboring communities and waterways. For example, in late September, 1999, 237 NC IHOs were located in flooded areas identified from satellite imagery provided by the NC Division of Emergency Management (Wing et al. 2002). Parasites, bacteria, viruses, nitrates, and other components of liquid IHO waste pose threats to human health (Burkholder et al. 2007; Cole et al. 2000).

Routine use of sub-therapeutic doses of antibiotics to promote weight gain of hogs promotes antibiotic resistance, making infections in humans more difficult to treat (Silbergeld et al. 2008). Airborne bacteria, including antibiotic resistant strains, have been isolated from IHO air emissions (Schulz et al. 2012) (Green et al. 2006) (Gibbs et al. 2006), and antibiotic resistant bacteria are associated with animal vectors near industrial animal operations, including flies (Graham et al. 2009), rodents (van de Giessen et al. 2009), and migratory geese that land on NC's IHO liquid waste pits (Cole et al. 2005). A recent medical records study from Pennsylvania shows that people living near IHO liquid waste application sites have elevated rates of infection with methicillin resistant *Staphylococcus aureus* (Casey et al. 2013). NC industrial livestock workers carry strains of *Staphylococcus aureus* that are associated with swine, including antibiotic resistant strains (Rinsky et al. 2013). These bacteria could be spread by liquid waste and airborne particles.

Using information from the United States Census of 1990 and locations of IHOs reported by the North Carolina Department of Environment and Natural Resources (NC-DENR) in 1998, we showed that the state's IHOs were disproportionately located in areas where more people of color (POC), primarily African Americans, live (Wing et al. 2000). We concluded that their disproportionate location in communities of color represented an environmental injustice. Since 1998 additional IHOs have obtained permission to operate and others are no longer in business. Additionally, between 1990 and 2010 the state's population size and spatial distribution changed due to births, deaths and migration. In this report we update our previous findings by evaluating whether IHOs operating under the general permit issued on March 7, 2014, will disproportionately impact POC, Blacks, Hispanics, and American Indians.

Materials and Methods

Lacking a list of the unique IHOs operating under the General Permit finalized in 2014, we used a list of all permitted industrial animal operations provided by NC-DENR on January 24, 2013 that we had prepared for prior research. First we excluded all non-swine operations from the list. Next we excluded swine operations with expired permits and permits with an allowable head count equal to zero. We also excluded permits that did not appear on a list of permitted animal operations published by DENR in January, 2014. We merged multiple permits issued for the same facilities to obtain a total head count for each operation. However the head count may be misleading as a measure of the pollution from each IHO because some facilities primarily house small pigs while others primarily house large hogs. We therefore calculated each facility's total steady state live weight (SSLW) using NC-DENR's formula based on the number and average weight of each growth stage of swine permitted at the facility. We interpret SSLW as a summary measure of the feces and urine produced by the swine of different growth stages at each facility.

Following the protocol provided in our previous study we excluded facilities operated by research institutions because they are subject to different location and management decisions than are commercial operations (Wing et al. 2000). Finally, we excluded facilities that do not hold a certificate of coverage to operate under the General Permit because they operate under individual permits or National Pollutant Discharge Elimination System general permits. The resulting facilities should closely approximate those expected to seek to continue operating under

the renewed General Permit. The renewed General Permit takes effect on October 1, 2014, at which time we plan to update the list created for this research.

The vulnerability of people of any race/ethnicity to having polluting facilities nearby can be affected by the race and ethnicity of other people in their community. For example, African-Americans who live in areas primarily populated by non-Hispanic Whites have, generally, a lower susceptibility to being near polluting facilities than African-Americans who live in areas primarily populated by Hispanics or American Indians. We therefore conducted our primary analyses of disproportionate impact using the POC category. We also conducted analyses for specific racial/ethnic categories. We defined the following racial/ethnic categories: non-Hispanic White (non-Hispanics who identified as White and no other race), POC (all people not categorized as non-Hispanic white), Black (people who identified themselves as African-American or Black with or without any other race), Hispanic of any race, and American Indian (people who identified themselves as American Indian with or without any other race). We used block-level race/ethnicity-specific population counts from the US Census of 2010.

As large-scale agricultural facilities, IHOs are not located in major cities. Following the protocol adopted in our prior research, we defined a study area for our primary analyses that excluded census blocks in the five major metropolitan areas of NC (Charlotte, Winston Salem, Greensboro, Durham and Raleigh) as well as 19 western counties that neither have an IHO nor border a county that has an IHO. We conducted additional analyses for the entire state.

We considered residents of blocks to be affected by IHOs within three miles of the block centroid. Blocks were categorized as either having, or not having, an IHO within three miles. Additionally, we calculated the total permitted SSLW of hogs within three miles of the centroid of each block as a measure of the total potential influence of pollutants from nearby IHOs on the residents of the block.

As in our prior study, we also calculated the population density of each block, defined as the number of people per square mile. Population density is a measure of rurality, which is strongly related to the availability of land for agriculture and the price of land. Racial/ethnic groups in NC differ in their urban vs. rural residence, making them differentially susceptible to types of polluting facilities that locate in rural vs. urban locations. For example, a larger proportion of non-Hispanic Whites in NC live in remote rural areas than do Blacks, the racial comparison is affected not only by the susceptibility of Whites vs. Blacks to IHOs, but also by differences in whether they live in rural vs. urban areas. By adjusting for population density (or rurality), we compare racial vulnerability to IHOs for racial groups within each level of rurality. This adjustment is analogous to other statistical adjustments in epidemiology, as when the death rates of two countries are compared: even though death rates at every age may be higher in a poor than a rich country, the poor country may have a lower overall death rate simply because it has a younger age distribution. In that case, age-adjustment is used to compare mortality in the two countries just as we use density-adjustment to compare the proximity to IHOs in areas with different racial/ethnic make-up.

We used weighted Poisson regression to quantify relationships between race/ethnicity and the presence of one or more IHOs within three miles of a block. We used weighted linear regression to quantify relationships between race/ethnicity and the SSLW of hogs permitted within three miles of a block. We used census block populations as weights. In density-adjusted models we included variables for the natural log of population density raised to the first, second and third power. As in our prior analysis, this cubic model fit the data well and additional power terms added little to the model fit (Wing et al. 2000). For the two largest racial/ethnic groups other than non-Hispanic Whites, POC and Blacks, we categorized race/ethnicity in groups of blocks 20% in width compared to blocks with no POC using indicator variables. Due to smaller numbers in these categories we did not fit models with indicator variables for Hispanics and American Indians. We also considered the percent of population of each race/ethnicity as a continuous variable, estimating the added burden of IHOs for a 10% increase in the population.

This study involves neither random sampling nor randomization of exposure to IHOs, therefore statistical significance testing is inappropriate and confidence intervals do not correspond to the probability that the true values of measures of association are within the interval. However, the US-EPA considers statistical significance in its assessment of environmental racism. We therefore report p-values for differences in proportions of each racial/ethnic group within 3 miles of an IHO using t-tests. We report 95% confidence intervals (CIs) as measures of precision of the associations estimated from regression models. 95% CIs that exclude the null value (1.0 for ratios and 0.0 for differences) are commonly considered to be statistically significant at $p<0.05$.

Results

We estimate that 2,055 IHOs were operating under the General Permit in January 2014, and that they were permitted to house approximately 1.2 billion pounds of swine (Table 1). The 160 (7.7%) IHOs permitted to house between 20 and 100 thousand pounds accounted for only 1% of the total permitted SSLW. The 342 (17.2%) IHOs permitted to house between 1 and 10.2 million pounds accounted for 46.5% of the total.

Table 2 shows that there are over 6.5 million residents of the study area. Approximately 986,000 (15.1%) of these live in census blocks whose centroid is within 3 miles of an IHO that operates under the General Permit. This includes 602,380 non-Hispanic Whites and 383,522 POC. 13.1% of non-Hispanic Whites and 19.9% of POC in the study area live in blocks within 3 miles of an IHO.

Based on the study area population in Table 2, Table 3 shows ratios of percentage of POC living within 3 miles of an IHO compared to the percentage of non-Hispanic Whites living within 3 miles of an IHO. The percentage of POC living within 3 miles of an IHO is 1.52 times higher than the percentage of non-Hispanic Whites. The percentages of Blacks, Hispanics and American Indians living within 3 miles of an IHO are 1.54, 1.39 and 2.18 times higher, respectively, than non-Hispanic Whites. If residents of the study area had been randomized to live within 3 miles of an IHO, the probabilities of observing differences of these magnitudes or greater are less than 0.0001; the observed differences are considered to be highly statistically significant.

We calculated these same ratios based on the entire state population of 9,535,483. The percentages of POC, Blacks, Hispanics and American Indians living within 3 miles of an IHO are 1.38, 1.40, 1.26 and 2.39 times higher than the percentage of non-Hispanic Whites, respectively. These ratios are considered to be highly statistically significant.

Figure 2 shows the percent of people living within 3 miles of an IHO in relation to the percent of people of color in blocks. In areas with less than 20% POC, just over 10% of the population lives within 3 miles of an IHO. In areas with 60-80% POC, over 20% of the population lives so close to an IHO. In areas with more than 80% POC, more than a quarter of the population lives within 3 miles of an IHO.

Table 4 presents ratios of the percent of people living within 3 miles of an IHO in blocks with >0 to <20%, 20 to <40%, 40 to <60%, 60 to <80% and 80 to 100% POC compared to blocks with no POC. The total population in these categories ranges from 526,305 in blocks with 60 to <80% POC to 2,577,015 in blocks with >0 to <20% POC. Ratios are statistically significantly elevated for all areas with more than 40% POC with or without adjustment for rurality. Ratios on the right side of Table 4 are adjusted for rurality. These ratios increase with the percentage POC. The highest ratios occur in areas with more than 80% POC, where over three times as many people live near IHOs, adjusted for rurality, compared to areas with no POC. These excesses are considered to be highly statistically significant.

Table 5 shows the results of analyses for Blacks parallel results to in Table 4 for all POC. Although ratios are somewhat lower for Blacks than POC, the percent of people living within 3 miles of an IHO is statistically significantly elevated in all groups of blocks that are more than 40% Black, with or without adjustment for rurality. In areas that are 80% or more Black, twice as many people live within 3 miles of an IHO compared to areas with no Blacks, a disparity that increases to three times more with adjustment for rurality. These excesses are considered to be highly statistically significant.

Table 6 presents the increased percent of the population living within 3 miles of an IHO for each additional 10 percent of the population of POC, Blacks, Hispanics, and American Indians. This analysis is similar to the results in Tables 4 and 5, but rather than using categories, the relationship between race/ethnicity and proximity to IHOs is modelled as a linear function. For every ten percent increase in POC, the proportion of people residing within 3 miles of an IHO increases, on average, by 10.7%. These values are 9.4, 8.5, and 16.2 for Blacks, Hispanics, and American Indians, respectively. Adjusting for rurality, 14.8% more people reside within 3 miles of an IHO for each additional ten percent POC. Adjusted values are 13.0, 16.3 and 11.8 for Blacks, Hispanics and American Indians, respectively. These linear relationships between race/ethnicity and living near IHOs are considered to be highly statistically significant.

Table 7 shows the difference in SSLW of hogs within 3 miles of residents of blocks with >0 to <20%, 20 to <40%, 40 to <60%, 60 to <80% and 80 to 100% POC compared to blocks with no POC. Blocks in categories with more than 20% POC have, on average, between 177 and 510 thousand pounds more hogs within 3 miles than blocks with no POC. Adjusting for population density, blocks with more than 60 percent POC have, on average, more than three-quarters of a

million pounds more hogs permitted within 3 miles than areas with no POC. These excesses are considered to be highly statistically significant.

Table 8 presents parallel results for percentage Black population. As for POC, areas with more than 20% Black residents have an excess SSLW of hogs compared to areas with no Black residents, and differences are greater with adjustment for rurality. Adjusted for population density, blocks with more than 40% Black residents have between 493,000 and 620,000 more pounds of hogs within 3 miles than areas with no Black residents. These excesses are considered to be highly statistically significant.

Table 9 provides the average additional SSLW of hogs permitted in areas with POC for each percent increase in specific racial/ethnic categories. Adjusted for population density, the permitted SSLW of hogs within 3 miles of blocks increases 100, 64, 242, and 92 thousand pounds for each ten percent increase in POC, Black, Hispanic, and American Indian population, respectively. These linear relationships between race/ethnicity and SSLW are considered to be highly statistically significant.

Figure 3 depicts the data analyzed above. Each dot represents an IHO that was operating under the General Permit in 2014. IHOs are concentrated in NC's Coastal Plain Region, between the Piedmont and Tidewater. The red areas of Figure 3 indicate that this region has more people of color than other parts of the study area.

Conclusion

IHOs operating under the NC-DENR General Permit in 2014 are disproportionately located near communities of color. The disparities are considered to be highly statistically significant for Blacks, Hispanics, American Indians, and all POC. IHOs pollute local ground and surface water. They routinely emit air pollutants that negatively impact the quality of life and health of nearby residents. In addition to their well-documented effects on physical, mental and social well-being, residents of areas with a high density of IHOs, and especially residents of color, have been subjected to intimidation including threats of legal action, violence, and job loss (Wing 2002). The industry's close ties with local and state government officials help it to avoid regulation that could protect neighbors, and creates barriers to democracy in rural communities of color (Thu 2001, 2003). These discriminatory impacts could be reduced by decreasing the density of production and use of technologies that prevent releases of pollutants.

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Figure 1
North Carolina study area, 2014

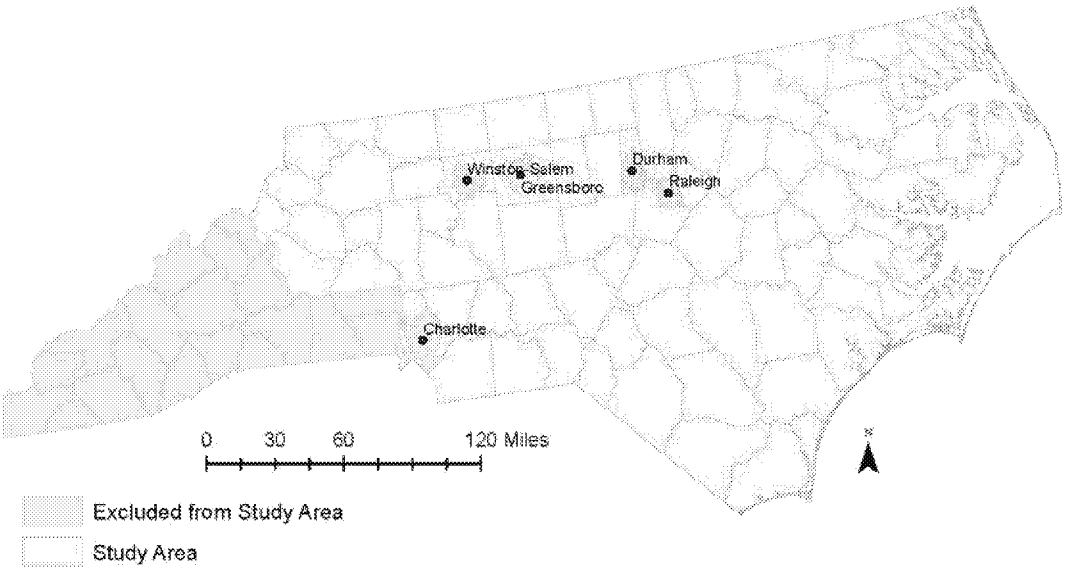

Figure 2
Percent of population living within 3 miles of an IHO
in relation to percent people of color, NC, 2014

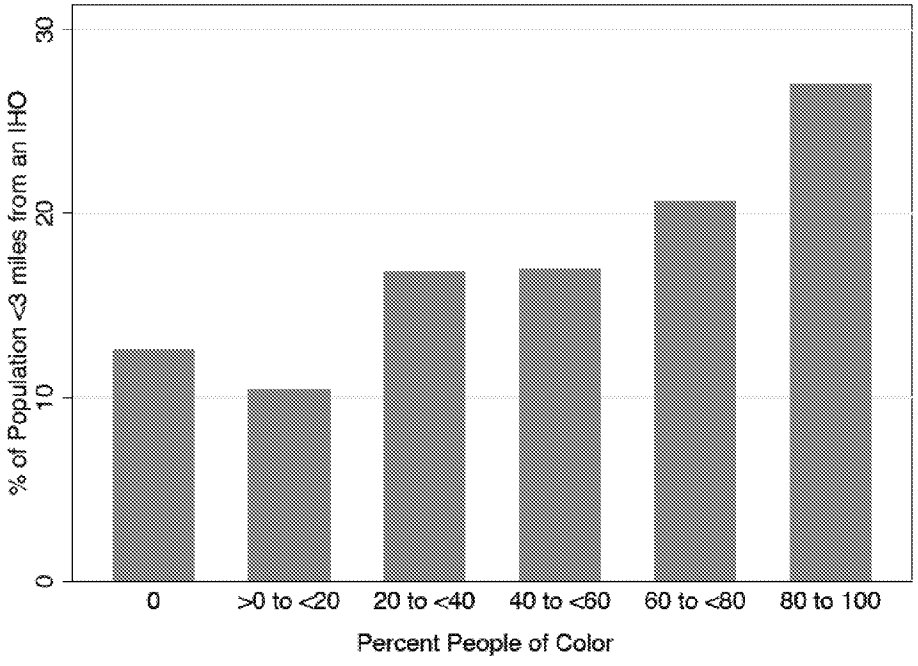

Figure 3
Racial and ethnic composition of census blocks and the locations of NC IHOs operating under the General Permit, 2014

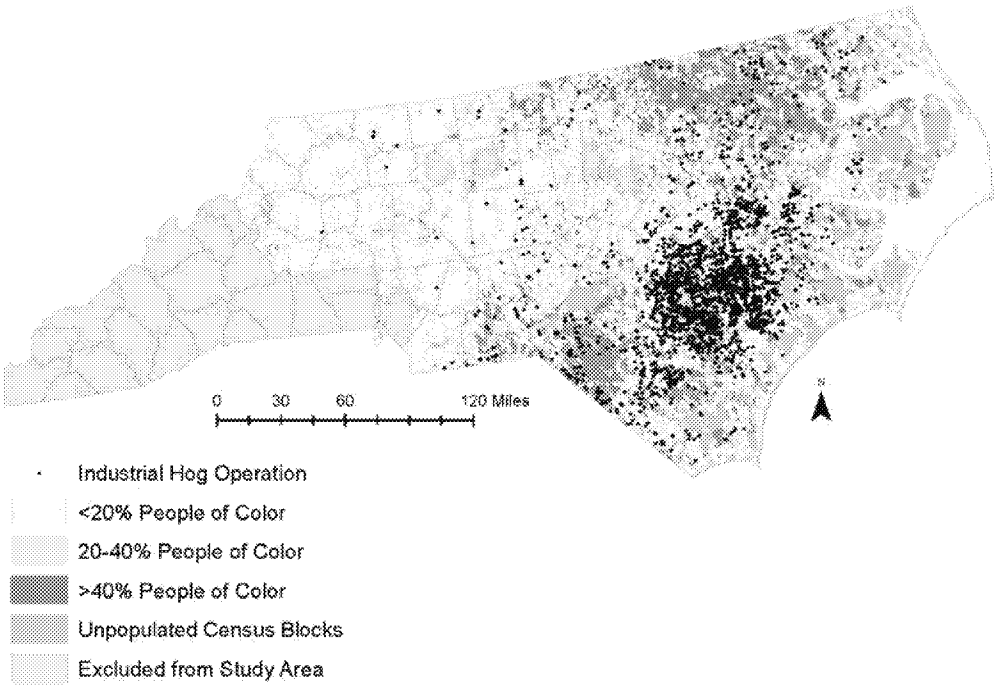

Table 1
Steady state live weight of IHOs
operating under the General Permit, NC, 2014

Permitted SSLW[1]	Number of IHOs	Percent of IHOs	Total SSLW[1]	Percent of total SSLW
20-	160	7.7	12,574	1.0
100-	447	21.6	76,626	5.9
250-	577	28.1	222,003	17.1
500-	529	25.4	383,918	29.6
1,000-10,200	342	17.2	603,354	46.5
Total	2055	100.0	1,298,474	100.0

[1]Thousands of pounds

Table 2
Racial and ethnic composition of NC census blocks within 3 miles
of an IHO and more than 3 Miles of an IHO, 2014

	≤3 miles from an IHO		>3 miles from an IHO		
Racial Category	Number	Percent	Number	Percent	Total[1]
Non-Hispanic white	602,380	13.1	4,003,455	86.9	4,605,835
POC[1]	383,522	19.9	1,548,276	80.1	1,931,798
Black	277,199	20.2	1,096,795	79.8	1,373,994
Hispanic	92,679	18.1	418,292	81.9	510,971
American Indian	40,621	28.5	101,872	71.5	142,493
Total[1]	985,902	15.1	5,551,731	84.9	6,537,633

[1]POC can be counted in more than one racial/ethnic category. The total population is equal to the number of non-Hispanic Whites plus the number of POC.

Table 3
Ratios of POC compared to non-Hispanic Whites living within 3 Miles of an IHO operating under the General Permit, 2014

Racial/ethnic Category	Population	≤3 miles from an IHO Number	Percent	Ratio[2]	p-value[3]
Non-Hispanic white	4,605,835	602,380	13.1	1.00	--
POC[1]	1,931,798	383,522	19.9	1.52	<0.0001
Black	1,373,994	277,199	20.2	1.54	<0.0001
Hispanic	510,971	92,679	18.1	1.38	<0.0001
American Indian	142,493	40,621	28.5	2.18	<0.0001
Total[1]	6,537,633	985,902	15.1		

[1]People of color can be counted in more than one racial/ethnic category. The total population is equal to the number of non-Hispanic Whites plus the number of POC.
[2]Ratio of the percent of people of other racial/ethnic groups to percent of non-Hispanic Whites living within 3 miles of an IHO
[3]A difference in proportions of this magnitude or greater would be expected to occur less than one time in ten thousand if people of different racial/ethnic groups had been randomized to live within 3 miles of an IHO.

Table 4
Ratios comparing the percent of people residing within 3 miles of an IHO in blocks with POC compared to blocks with no POC

Percent POC	Population	Unadjusted Prevalence Ratio	95% CI	Adjusted[1] Prevalence Ratio	95% CI
0	694,747	1.0	referent	1.00	referent
>0 to <20	2,577,015	0.83	0.82, 0.83	1.01	1.00,1.02
20 to <40	1,364,923	1.34	1.33, 1.45	1.95	1.93, 1.97
40 to <60	799,124	1.35	1.34, 1.36	2.15	2.13, 2.16
60 to <80	526,305	1.64	1.62, 1.65	2.53	2.50, 2.55
80 to 100	575,519	2.14	2.12, 2.16	3.30	3.27, 3.32

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 5
Ratios comparing the percent of people residing within 3 miles of an IHO in blocks with Black residents compared to blocks with no Black residents

Percent Black	Population	Unadjusted Prevalence Ratio	95% CI	Adjusted[1] Prevalence Ratio	95% CI
0	1,308,061	1.00	referent	1.00	referent
>0 to <20	2,941,746	0.93	0.92, 0.94	1.20	1.19,1.21
20 to <40	1,043,277	1.44	1.43, 1.45	2.07	2.05, 2.08
40 to <60	536,198	1.52	1.51, 1.53	2.18	2.17, 2.20
60 to <80	336,232	1.57	1.56, 1.59	2.19	2.17, 2.21
80 to 100	372,119	2.01	1.99, 2.02	3.06	3.04, 3.09

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 6
Percent difference in the percent of people residing within 3 miles of an IHO for a ten percent increase in the population of each racial/ethnic group

Racial/ethnic group	Unadjusted Percent	95% CI	Adjusted[1] Percent	95% CI
POC	10.7	10.6, 10.8	14.8	14.7, 14.9
Black	9.4	9.3, 9.4	13.0	12.9, 13.1
Hispanic	8.5	8.4, 8.6	16.3	16.1, 16.4
American Indian	16.2	16.0, 16.4	11.8	11.6, 12.0

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 7
Difference in SSLW of hogs within 3 miles of residents of blocks with POC compared to blocks with no POC

Percent POC	Unadjusted SSLW[2]	95% CI	Adjusted[1] SSLW	95% CI
0	Referent	-	Referent	-
>0 to <20	-35	-73, 3	190	154, 227
20 to <40	177	136, 219	535	495, 575
40 to <60	308	262, 353	717	672, 762
60 to <80	510	459, 561	896	846, 946
80 to 100	453	403, 503	837	788, 885

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density
[2]1,000s of pounds

Table 8
Difference in SSLW of hogs within 3 miles of residents of blocks with Black residents compared to blocks with no Black residents

Percent Black	Unadjusted SSLW[2]	95% CI	Adjusted[1] SSLW	95% CI
0	Referent	-	Referent	-
>0 to <20	-4	-33, 25	237	207, 265
20 to <40	190	153, 227	493	457, 530
40 to <60	327	281, 372	620	576, 665
60 to <80	275	221, 330	547	494, 599
80 to 100	165	113, 218	494	444, 545

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density
[2]1,000s of pounds

Table 9
Difference in SSLW of hogs within 3 miles of residents of blocks for a ten percent increase in population of each racial group

Racial/ethnic group	Unadjusted SSLW[2]	95% CI	Adjusted[1] SSLW	95% CI
POC	67	63, 71	100	96, 104
Black	38	34, 42	64	60, 68
Hispanic	183	174, 192	242	234, 251
American Indian	124	111, 137	92	80, 105

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density
[2]1,000s of pound

Industrial Hog Operations in North Carolina Disproportionately Impact African-Americans, Hispanics and American Indians

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Revised: October 19, 2015

Summary

Background: In 2014, the North Carolina Department of Environment and Natural Resources (NC-DENR) issued a swine waste management general permit (the General Permit) covering more than 2,000 industrial hog operations (IHOs). These facilities house animals in confinement, store their feces and urine in open pits or cesspools, and apply the waste to surrounding fields. Air pollutants from the routine operation of confinement houses, cesspools, and waste sprayers affect nearby neighborhoods, causing disruption of activities of daily living, stress, anxiety, mucous membrane irritation, respiratory conditions, reduced lung function, and acute blood pressure elevation. Prior studies showed that this industry disproportionately impacts people of color in North Carolina.

Methods: We obtained records on the sizes and locations of permitted IHOs from NC-DENR and calculated the steady state live weight (SSLW) of hogs as an indicator of the amount of feces and urine produced at each IHO. We obtained block-level information on race and ethnicity from the 2010 census of the United States. We compared the proportions of people of color (POC), Blacks, Hispanics, and American Indians living within 3 miles of an IHO to the proportion of non-Hispanic Whites. We quantified relationships between race/ethnicity, presence of one or more IHOs, and the SSLW of IHOs, using Poisson regression and linear regression to adjust for rurality.

Results: Analyses based on a study area that excludes the State's five major cities and western counties that have no presence of this industry show that the proportion of POC living within 3 miles of an industrial hog operation is 1.46 times higher than the proportion of non-Hispanic Whites. The proportions of Blacks, Hispanics, and American Indians living within 3 miles of an industrial hog operation are 1.50, 1.41, and 2.22 times higher, respectively, than the proportion of non-Hispanic Whites ($p<0.0001$). In census blocks with 80 or more percent POC, the proportion of the population living within 3 miles of an industrial hog operation is 1.81 times higher than in blocks with no POC. This excess increases to 3.01 times higher with adjustment for rurality. Adjusted for rurality, the SSLW of hogs within 3 miles of a census block increases, on average, 74, 47, 165, and 72 thousand pounds for every 10 percent increase in POC, Black, Hispanic, and American Indian population ($p<0.0001$).

Conclusions: IHOs in North Carolina emit air and water pollutants that can be measured in nearby neighborhoods where they adversely impact the health and quality of life of residents. Census blocks near IHOs re-permitted in 2014 are disproportionately populated by Black, Hispanic, and American Indian residents, a spatial pattern recognized as environmental racism.

Background

Swine production in North Carolina changed dramatically during the last decades of the 20th century. Between 1982 and 2006, the number of hog operations in the State declined precipitously while the hog population increased from approximately 2 to 10 million (Edwards and Driscoll 2009). Production became concentrated in eastern North Carolina (Furuseth 1997).

Traditional North Carolina producers raised small numbers of hogs, commonly fewer than 25, as one of several commercial crops on diversified farms (Edwards and Driscoll 2009). In contrast, industrial producers raise large numbers of hogs, often many thousands, in confinement houses that are designed to vent toxic gases and particles into the environment. Animal wastes are flushed into open cesspools and then sprayed on nearby fields. Pollutants emitted by IHOs include hydrogen sulfide, ammonia, a wide array of volatile organic compounds, and bioaerosols including endotoxins, bacteria, yeasts, molds, and other respiratory irritants (Cole et al. 2000) (Schiffman et al. 2001).

The negative impacts of particles and gases inside IHO confinements on worker health have been extensively described (Casey et al. 2015; Cole et al. 2000; Donham 1993; Donham et al. 1995; Donham 1990; Donham 2010). Environmental levels of IHO pollutants are lower than inside confinements, however, workers in physically demanding jobs tend to be less susceptible to pollutants than some members of exposed communities, which includes children, people with allergies, asthma, or other respiratory or cardiovascular conditions. An extensive body of peer-reviewed scientific evidence shows that IHOs release contaminants into neighboring communities where they affect the health and quality of life of neighbors. Many of these studies have been conducted in North Carolina. Hydrogen sulfide concentrations within 1.5 miles of IHOs in North Carolina are associated with neighbors' ratings of hog odor and inability to engage in routine daily activities (Wing et al. 2008), increased stress and anxiety (Horton et al. 2009), irritation of the eyes, nose and throat, respiratory symptoms (Schinasi et al. 2011), and acute elevation of systolic blood pressure (Wing et al. 2013). A study of North Carolina public middle school children who participated in an asthma survey, which was conducted by the North Carolina Department of Health and Human Services, found that children attending schools within three miles of an IHO had more asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits than students who attended schools farther away (Mirabelli et al. 2006). The same study reported a 23% higher prevalence of wheezing symptoms among children who attended schools where staff reported noticing livestock odor inside school buildings twice or more per month compared to children who attended schools where no livestock odor was reported (Mirabelli et al. 2006). Other studies in North Carolina (Tajik et al. 2008) (Wing and Wolf 2000) (Bullers 2005) (Schiffman et al. 1995) and elsewhere (Donham et al. 2007) (Thu et al. 1997) (Radon et al. 2007) also document negative impacts of IHO air pollution on neighbors' health and quality of life.

Liquid contaminants from IHOs are released to the environment through leakage of animal waste storage pits, runoff from land application of liquid wastes, atmospheric deposition, and failure of the earthen walls of waste pits (Burkholder et al. 2007) (Wing et al. 2002). A recent study of DNA from swine-specific bacteria found increased prevalence of a genetic marker of pig bacteria in surface waters downstream from IHOs, and increased prevalence of the marker

following precipitation that can transport fecal wastes from land application sites into surface waters (Heaney et al. 2015). Overflow of waste pits during heavy rain events results in massive spills of animal waste into neighboring communities and waterways. For example, in late September, 1999, 237 North Carolina IHOs were located in flooded areas identified from satellite imagery provided by the NC Division of Emergency Management (Wing et al. 2002). Parasites, bacteria, viruses, nitrates, and other components of liquid IHO waste pose threats to human health (Burkholder et al. 2007; Cole et al. 2000).

Routine use of sub-therapeutic doses of antibiotics to increase weight gain of hogs promotes antibiotic resistance, making infections in humans more difficult to treat (Silbergeld et al. 2008). Airborne bacteria, including antibiotic-resistant strains, have been isolated from IHO air emissions (Gibbs et al. 2006; Green et al. 2006; Schulz et al. 2012), and antibiotic-resistant bacteria are associated with animal vectors near industrial animal operations, including flies (Graham et al. 2009), rodents (van de Giessen et al. 2009), and migratory geese that land on North Carolina's IHO liquid waste pits (Cole et al. 2005). A recent medical records study from Pennsylvania shows that people living near IHO liquid waste application sites have elevated rates of infection with methicillin-resistant *Staphylococcus aureus* (Casey et al. 2013). North Carolina industrial livestock workers carry strains of *Staphylococcus aureus* that are associated with swine, including antibiotic-resistant strains (Rinsky et al. 2013). These bacteria could be spread by liquid waste and airborne particles.

Because of the well-documented ability of IHOs to degrade the environment and health of nearby communities, their disproportionate location in communities of color is an environmental justice issue. In an earlier study based on information from the United States Census of 1990 and locations of IHOs in 1998 reported by the NC-DENR, our research group showed that the State's IHOs were disproportionately located in areas where more POC, primarily African Americans, live (Wing et al. 2000). We concluded that their disproportionate location in communities of color represented an environmental injustice. Since 1998, additional IHOs have obtained permission to operate and others are no longer in business. Additionally, between 1990 and 2010 the State's population size and spatial distribution changed due to births, deaths, and migration. In this report, we update our previous findings (including an earlier version of this report filed with the US-EPA in September, 2014) by evaluating whether IHOs covered under the General Permit issued on March 7, 2014, disproportionately impact POC, Blacks, Hispanics, and American Indians.

Materials and Methods

On January 5, 2015, we downloaded a list of all industrial livestock operations from the NC-DENR website. From that list we excluded all non-swine operations and facilities that operate under individual permits or National Pollutant Discharge Elimination System general permits and facilities with certificates of coverage that expired prior to October 1, 2014. Following the protocol provided in our previous study, which we also followed in the 2014 Report, we excluded facilities operated by research institutions because they are subject to different location and management decisions than commercial operations (Wing et al. 2000). For facilities holding multiple permits, for example wean-to-feeder and feeder-to-finish, we combined counts for different stages of growth to obtain a total head count for each operation. To estimate the

potential pollution source from IHOs with different size animals (boars, farrow-to-wean, wean-to-feeder and feeder-to-finish), we calculated each facility's total steady state live weight (SSLW) of hogs based on the number and average weight of each growth stage of swine permitted at the facility. We corrected latitude and longitude for IHOs with geographic coordinates outside the county in which they were listed using the protocol developed for our previous study (Wing et al. 2000).

The vulnerability of people of any race/ethnicity to having polluting facilities nearby can be affected by the race and ethnicity of other people in their community. For example, African-Americans who live in areas primarily populated by non-Hispanic Whites may have, generally, a lower susceptibility to being near polluting facilities than African-Americans who live in areas primarily populated by Hispanics or American Indians. We therefore conducted our primary analyses of disproportionate impact using the POC category. We also conducted analyses for specific racial/ethnic categories. We defined the following racial/ethnic categories: non-Hispanic White (non-Hispanics who identified as White and no other race), POC (all people not categorized as non-Hispanic white), Black (people who identified themselves as African-American or Black with or without any other race), Hispanic of any race, and American Indian (people who identified themselves as American Indian with or without any other race). We used block-level race/ethnicity-specific population counts from the US Census of 2010.

As large-scale agricultural facilities, IHOs are not located in major cities. Following the protocol adopted in our prior research, we defined a study area for our primary analyses that excluded census blocks in the five major metropolitan areas of North Carolina (Charlotte, Winston Salem, Greensboro, Durham, and Raleigh) as well as 20 western counties that neither have an IHO nor border a county that has an IHO. We conducted additional analyses for the entire State.

We considered people to be within the potential impact zone of IHOs if they lived in census blocks whose block centroids were within three miles of an IHO re-permitted in 2014. Blocks were categorized as either having, or not having, an IHO within three miles. Additionally, we considered the total permitted SSLW of hogs within three miles of the centroid of each block as a measure of the total potential influence of pollutants from nearby IHOs on the residents.

As in our prior study, we also calculated the population density of each block, defined as the number of people per square mile. Population density is a measure of rurality, which is strongly related to the availability of land for agriculture and the price of land. Racial/ethnic groups in North Carolina differ in their urban versus rural residence, making them differentially susceptible to types of polluting facilities that locate in rural versus urban locations. For example, a larger proportion of non-Hispanic Whites in North Carolina live in remote rural areas than do Blacks, therefore the susceptibility of Whites versus Blacks to IHOs is affected by their differential residence in more rural versus more urban areas. By adjusting for population density (rurality), we compare racial vulnerability to IHOs for racial groups within each level of rurality. This adjustment is analogous to other statistical adjustments in epidemiology, as when the death rates of two countries are compared: even though death rates at every age may be higher in a poor than a rich country, the poor country may have a lower overall death rate because it has a younger age distribution. In that case, age-adjustment is used to compare mortality in the two

countries just as we use density-adjustment to compare the proximity to IHOs in areas with different racial/ethnic make-up.

We used weighted Poisson regression to quantify relationships between race/ethnicity and the presence of one or more IHOs within three miles of a block and weighted linear regression to quantify relationships between race/ethnicity and the SSLW of hogs permitted within three miles of a block. We used census block populations as weights. In density-adjusted models, we included variables for the natural log of population density raised to the first, second, and third power. As in our prior analysis (Wing et al. 2000), this cubic model fit the data well and additional power terms added little to the model fit. For the two largest racial/ethnic groups other than non-Hispanic Whites, POC, and Blacks, we categorized race/ethnicity in groups of blocks 20% in width compared to blocks with no POC using indicator variables. Due to smaller numbers in these categories, we did not fit models with indicator variables for Hispanics and American Indians. We also considered the percent of people of each race/ethnicity as a continuous variable, estimating the added burden of IHOs for a 10% increase in the population.

This study involves neither random sampling nor randomization of exposure to IHOs, therefore statistical significance testing is inappropriate and confidence intervals do not correspond to the probability that the true values of measures of association are within the interval. However, the US-EPA considers statistical significance in its assessment of environmental racism. We therefore report p-values for differences in proportions of each racial/ethnic group within 3 miles of an IHO using t-tests. We report 95% confidence intervals (CIs) as measures of precision of the associations estimated from regression models. 95% CIs that exclude the null value (1.0 for ratios and 0.0 for differences) are commonly considered to be statistically significant at $p<0.05$.

Results

Based on criteria enumerated above, 2,029 IHOs housing 1.29 billion pounds of swine are covered under the General Permit issued in March, 2014 (Table 1). The 155 (7.6%) IHOs permitted to house between 20 and 100 thousand pounds accounted for only 1% of the total permitted SSLW. The 343 (16.9%) IHOs permitted to house between 1 and 10.3 million pounds accounted for 46.7% of the total (Table 1).

Figure 1 shows counties included in the study area, counties and cities excluded from the study area, and the locations of IHOs covered under the General Permit issued in 2014 by NC-DENR. Figure 2 shows the proportion of POC in 2010 census blocks included in the study area and the total population in each of six categories.

There are over 6.5 million residents of the study area (Table 2). Approximately 961 thousand (14.8%) of these residents live in census blocks whose centroid is within 3 miles of an IHO covered under the 2014 General Permit. This includes 563,228 non-Hispanic Whites and 397,661 POC. 12.9% of non-Hispanic Whites and 18.7% of POC in the study area live in blocks within 3 miles of an IHO.

Based on the study area population in Table 2, Table 3 shows ratios of the percentages of POC living within 3 miles of an IHO compared to the percentages of non-Hispanic Whites living

within 3 miles of an IHO. The percentage of POC living within 3 miles of an IHO is 1.46 times higher than the percentage of non-Hispanic Whites. The percentages of Blacks, Hispanics, and American Indians living within 3 miles of an IHO are 1.50, 1.41 and 2.22 times higher, respectively, than non-Hispanic Whites. If residents of the study area had been randomized to live within 3 miles of an IHO, the probabilities of observing differences of these magnitudes or greater would be less than 0.0001; the observed differences are considered to be highly statistically significant.

We calculated these same ratios based on the entire State population of 9,535,483. The percentages of POC, Blacks, Hispanics, and American Indians living within 3 miles of an IHO are 1.38, 1.40, 1.26 and 2.39 times higher than the percentage of non-Hispanic Whites, respectively. These ratios are considered to be highly statistically significant.

Figure 3 shows the percent of people living within 3 miles of an IHO in relation to the percent of POC in blocks. The percent of people within 3 miles of an IHO is lowest in blocks with >0 to 20% POC (9.8%) and highest in blocks with >80% POC (23.9%).

Table 4 presents ratios of the percent of people living within 3 miles of an IHO in blocks with POC in the ranges of >0 to <20%, 20 to <40%, 40 to <60%, 60 to <80% and 80 to 100% compared to blocks with no POC. The population of these categories ranges from a low of 559,179 in blocks with no POC to a high of 2,383,810 in blocks with >0 to <20% POC. Ratios on the right side of Table 4 are adjusted for rurality. These ratios are significantly elevated in all categories with more than 20% POC. The highest ratio, indicating that 3.01 times as many residents live near IHOs compared to blocks with no POC, occurs for blocks with more than 80% POC.

Table 5 shows results of the same analyses for Blacks. They also show that the percent of people living within 3 miles of an IHO is statistically significantly elevated in all groups of blocks that are more than 20% Black, with or without adjustment for rurality. With adjustment for rurality, areas that are 80% or more Black, 2.74 times as many people live within 3 miles of an IHO compared to areas with no Blacks.

Table 6 shows the average increase in the population living within 3 miles of an IHO for a 10 percent increase in the population of POC, Blacks, Hispanics, and American Indians. This analysis is similar to the results in Tables 4 and 5, but rather than using categories, the relationship between race/ethnicity and proximity to IHOs is modeled as a linear function. For every ten percent increase in POC, the proportion of people residing within 3 miles of an IHO increases, on average, by 9.7%. These values are 8.6, 9.3, and 16.7 for Blacks, Hispanics, and American Indians, respectively. Adjusting for rurality, 14.5% more people reside within 3 miles of an IHO for each additional ten percent POC. Adjusted values are 12.3, 17.3 and 12.0 for Blacks, Hispanics, and American Indians, respectively. These linear relationships between race/ethnicity and living near IHOs are considered to be highly statistically significant.

Table 7 shows the difference in SSLW of hogs within 3 miles of residents of blocks with POC in the ranges of >0 to <20%, 20 to <40%, 40 to <60%, 60 to <80% and 80 to 100% POC compared to blocks with no POC. Blocks in categories with more than 20% POC have, on average,

between 58,000 and 341,000 pounds more hogs within 3 miles than blocks with no POC. Adjusting for population density, blocks with more than 60 percent POC have, on average, more than half a million pounds more hogs permitted within 3 miles than areas with no POC. These excesses are considered to be highly statistically significant.

Table 8 presents parallel results for percentage Black population. As for POC, areas with more than 20% Black residents have an excess SSLW of hogs compared to areas with no Black residents, and differences are greater with adjustment for rurality. Adjusted for population density, blocks with more than 40% Black residents have approximately 350,000 more pounds of hogs within 3 miles than areas with no Black residents. These excesses are considered to be highly statistically significant.

Table 9 provides the average additional SSLW of hogs permitted in areas with POC for each percent increase in specific racial/ethnic categories. Adjusted for population density, the permitted SSLW of hogs within 3 miles of blocks increases 74, 47, 165, and 72 thousand pounds for each ten percent increase in POC, Black, Hispanic, and American Indian population, respectively. These linear relationships between race/ethnicity and SSLW are considered to be highly statistically significant.

As shown in Figure 1, IHOs are concentrated in North Carolina's Coastal Plain Region, between the Piedmont and Tidewater. Figure 2 shows that this region has more people of color than other parts of the study area. The racial and ethnic disparities reported above would be larger if the counties of western North Carolina, which, with the exception of Cherokee County, have low proportions of POC, were included in the analysis.

Conclusion

IHOs operating under the NC-DENR General Permit in 2014 are disproportionately located near communities of color. These disparities are considered to be highly statistically significant for Blacks, Hispanics, American Indians, and all POC. IHOs pollute local ground and surface water. They routinely emit air pollutants that negatively impact the quality of life and health of nearby residents. In addition to their well-documented effects on physical, mental, and social well-being, residents of areas with a high density of IHOs, and especially residents of color, have been subjected to intimidation including threats of legal action, violence, and job loss (Wing 2002). The industry's close ties with local and state government officials help it to avoid regulation that could protect neighbors, and create barriers to democracy in rural communities of color (Thu 2001, 2003). These discriminatory impacts could be reduced by decreasing the density of production and use of technologies that prevent releases of pollutants.

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Figure 1
North Carolina Counties Included in the Study Area, Counties and Cities Excluded from the Study Area, and Locations of IHOs operating under the 2014 General Permit

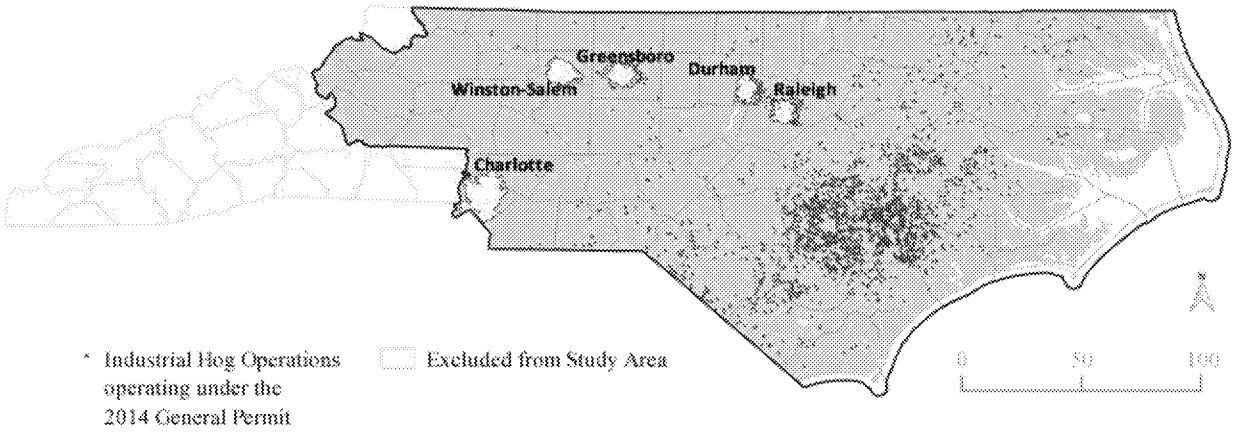

Figure 2
Percentage of People of Color in North Carolina Census Blocks, 2010

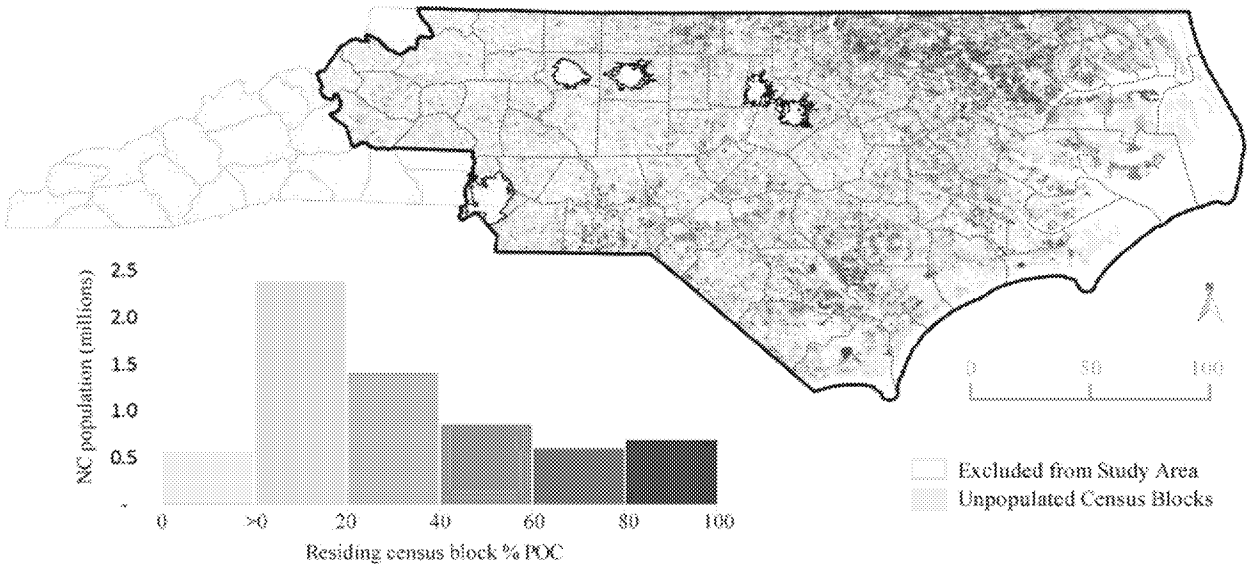

Figure 3
Percent of Population Living Within 3 miles of an IHO Covered under the North Carolina General Permit, 2014 in Relation to Percent People of Color

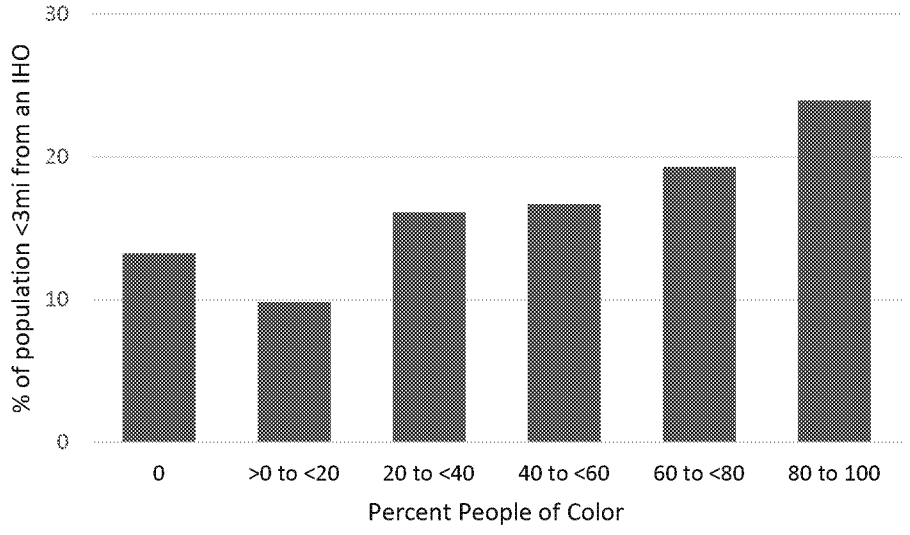

Table 1
Steady State Live Weight of IHOs Operating under the General Permit, NC, 2014

Permitted SSLW[1]	Number of IHOs	Percent of IHOs	Total SSLW[1]	Percent of total SSLW
21-	155	7.6	12,226	0.9
100-	439	21.6	75,135	5.8
250-	570	28.1	219,812	17.1
500-	522	25.7	379,414	29.4
1,000-10,260	343	16.9	601,988	46.7
Total	2,029	100.0	1,288,575	100.0

[1]Thousands of pounds

Table 2
Racial/Ethnic Composition of NC Census Blocks Less than and More than 3 Miles of an IHO Operating Under the 2014 General Permit

	≤3 miles from an IHO		>3 miles from an IHO		
Racial Category	Number	Percent	Number	Percent	Total[1]
Non-Hispanic white	563,228	12.9	3,817,835	87.1	4,381,063
POC	397,661	18.7	1,724,393	81.3	2,122,054
Black	264,272	19.3	1,105,923	80.7	1,370,195
Hispanic	92,204	18.1	416,938	81.9	509,142
American Indian	40,578	28.5	101,599	71.5	142,177
Total[1]	960,889	14.8	5,542,228	85.2	6,503,117

[1]POC can be counted in more than one racial/ethnic category. The total population is equal to the number of non-Hispanic Whites plus the number of POC.

Table 3
Ratios of POC Compared to Non-Hispanic Whites Living within 3 Miles of an IHO Operating under the 2014 General Permit

Racial/ethnic		≤3 miles from an IHO			
Category	Population	Number	Percent	Ratio[2]	p-value[3]
Non-Hispanic white	4,381,063	563,228	12.9	1.00	--
POC*	2,122,054	397,661	18.7	1.46	<0.0001
Black	1,370,195	264,272	19.3	1.50	<0.0001
Hispanic	509,142	92,204	18.1	1.41	<0.0001
American Indian	142,177	40,578	28.5	2.22	<0.0001
Total	6,503,117	960,889	14.8		

[1]People of color can be counted in more than one racial/ethnic category. The total population is equal to the number of non-Hispanic Whites plus the number of POC.
[2]Ratio of the percent of people of other racial/ethnic groups to percent of non-Hispanic Whites living within 3 miles of an IHO
[3]A difference in proportions of this magnitude or greater would be expected to occur less than one time in ten thousand if people of different racial/ethnic groups had been randomized to live within 3 miles of an IHO.

Table 4
Ratios Comparing the Percent of People Residing within 3 Miles of an IHO in Blocks with POC Compared to Blocks without POC

Percent POC	Population	Unadjusted Prevalence Ratio	95% CI	Adjusted[1] Prevalence Ratio	95% CI
0	559,179	1.00		1.00	
>0 to <20	2,383,810	0.75	0.74, 0.75	0.91	0.90, 0.92
20 to <40	1,410,751	1.22	1.21, 1.23	1.79	1.77, 1.80
40 to <60	858,568	1.26	1.25, 1.28	2.04	2.03, 2.06
60 to <80	597,258	1.46	1.45, 1.47	2.38	2.35, 2.40
80 to 100	693,551	1.81	1.80, 1.83	3.01	2.99, 3.04

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 5
Ratios Comparing the Percent of People Residing within 3 miles of an IHO in Blocks with Blacks Compared to Blocks without Blacks

Percent Black	Population	Unadjusted Prevalence Ratio	95% CI	Adjusted[1] Prevalence Ratio	95% CI
0	1,288,564	1.00		1.00	
>0 to <20	2,931,777	0.92	0.91, 0.92	1.18	1.17, 1.19
20 to <40	1,043,183	1.43	1.42, 1.44	2.05	2.04, 2.07
40 to <60	534,792	1.51	1.50, 1.53	2.18	2.16, 2.19
60 to <80	333,780	1.55	1.54, 1.56	2.15	2.13, 2.17
80 to 100	371,021	1.79	1.77, 1.80	2.74	2.71, 2.76

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 6
Average Percent Difference in the Percent of People Residing within 3 miles of an IHO for a Ten Percent Increase in Each Racial/Ethnic Group

Racial Group	Unadjusted Percent	95% CI	Adjusted[1] Percent	95% CI
POC	9.7	(9.6, 9.8)	14.5	(14.5, 14.6)
Black	8.6	(8.5, 8.6)	12.3	(12.2, 12.3)
Hispanic	9.3	(9.2, 9.5)	17.3	(17.2, 17.5)
American Indian	16.7	(16.5, 16.8)	12.0	(11.9, 12.2)

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

Table 7
Average Difference in SSLW of hogs within 3 miles of residents of blocks with POC compared to blocks without POC

Percent POC	Unadjusted SSLW[2]	95% CI	Adjusted[1] SSLW[2]	95% CI
0	0	-	0	-
>0 to <20	-82	-110, -54	55	27, 82
20 to <40	58	28, 88	287	257, 316
40 to <60	123	90, 156	395	363, 427
60 to <80	284	249, 320	560	525, 595
80 to 100	341	307, 375	625	591, 658

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density

[2]1,000s of pound

Table 8
Average Difference in SSLW of Hogs within 3 Miles of Blocks with Blacks Compared to Blocks without Blacks

Percent POC	Unadjusted SSLW[2]	95% CI	Adjusted[1] SSLW[2]	95% CI
0	0	-	0	-
>0 to <20	-46	-66, -26	96	76, 116
20 to <40	96	71, 121	283	259, 308
40 to <60	195	164, 227	379	349, 410
60 to <80	186	149, 223	356	319, 392
80 to 100	141	105, 176	348	313, 383

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density
[2]1,000s of pounds

Table 9
Average Difference in SSLW of Hogs within 3 Miles of Residents of Blocks for a Ten Percent Increase in Each Racial/Ethnic Group

Racial/Ethnic Group	Unadjusted SSLW2	95% CI	Adjusted1 SSLW2	95% CI
POC	48	46, 51	74	71, 76
Black	30	27, 33	47	44, 50
Hispanic	127	121, 133	165	159, 171
Am. Indian	94	85, 102	72	64, 81

[1]Adjusted for rurality using a cubic polynomial of the natural log of population density
[2]1,000s of pound

To: Farrell, Ericka[Farrell.Ericka@epa.gov]; Fitzpatrick, Ryan (CRT)[Ryan.Fitzpatrick2@usdoj.gov]
Cc: Covington, Jeryl[Covington.Jeryl@epa.gov]; Moffa, Anthony[Moffa.Anthony@epa.gov]; Lareau, Alyssa (CRT)[Alyssa.Lareau@usdoj.gov]
From: O'Lone, Mary
Sent: Wed 2/18/2015 7:55:43 PM
Subject: Re: Staff call re potential RFI content

Ex. 5 - Deliberative Process

Ryan's are the ones in track changes.

Ericka & Jeryl-

If you think one of the Ex. 5 - Deliberative Process questions it relevant & the content is not already covered, then please mention it on the call so we can discuss.

Thanks, Mary

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Ave., NW

Washington, DC 20460

(202) 564-4992

From: Farrell, Ericka
Sent: Wednesday, February 18, 2015 2:49 PM
To: Fitzpatrick, Ryan (CRT); O'Lone, Mary
Cc: Covington, Jeryl; Moffa, Anthony; Lareau, Alyssa (CRT)
Subject: RE: Staff call re potential RFI content

Hey Ryan,

We want to follow some of the questions we may have used from another case for the same complainant representative. I am sharing the questions that pertain strictly too this complaint but there are other questions that we may want to follow that we have not discussed yet with our management that we may want to utilize for this complaint.

From: Fitzpatrick, Ryan (CRT) [mailto:Ryan.Fitzpatrick2@usdoj.gov]
Sent: Wednesday, February 18, 2015 2:16 PM
To: Farrell, Ericka; O'Lone, Mary
Cc: Covington, Jeryl; Moffa, Anthony; Lareau, Alyssa (CRT)
Subject: RE: Staff call re potential RFI content

Hey Ericka,

Our draft is just staff-level work, it hasn't been reviewed or approved of and is meant to just kind of let you all know the direction of our thinking.

Ryan N. Fitzpatrick

Presidential Management Fellow Program Analyst

Federal Coordination and Compliance Section

Civil Rights Division

U.S. Department of Justice

950 Pennsylvania Avenue, NW

Washington, DC 20530

(202) 353-4084

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From: Farrell, Ericka [mailto:Farrell.Ericka@epa.gov]

Sent: Wednesday, February 18, 2015 2:13 PM
To: O'Lone, Mary; Fitzpatrick, Ryan (CRT)
Cc: Covington, Jeryl; Moffa, Anthony; Lareau, Alyssa (CRT)
Subject: RE: Staff call re potential RFI content

Hey Mary,

We have some draft questions but we will not be disclosing until they have been reviewed.

Ericka

From: O'Lone, Mary
Sent: Wednesday, February 18, 2015 11:51 AM
To: Fitzpatrick, Ryan (CRT)
Cc: Covington, Jeryl; Moffa, Anthony; Farrell, Ericka; Lareau, Alyssa (CRT)
Subject: Re: Staff call re potential RFI content

Attached is the draft that Anthony & I have been working on.

Look forward to seeing yours & any Jeryl & Ericka may have come up with.

Thanks,

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Ave., NW

Washington, DC 20460

(202) 564-4992

From: Fitzpatrick, Ryan (CRT) <Ryan.Fitzpatrick2@usdoj.gov>
Sent: Wednesday, February 18, 2015 9:44 AM
To: O'Lone, Mary
Subject: RE: Staff call re potential RFI content

We'll be on the call. I'm working on getting my draft out ASAP

Ryan N. Fitzpatrick

Presidential Management Fellow Program Analyst

Federal Coordination and Compliance Section

Civil Rights Division

U.S. Department of Justice

950 Pennsylvania Avenue, NW

Washington, DC 20530

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-----Original Appointment-----
From: O'Lone, Mary [mailto:OLone.Mary@epa.gov]
Sent: Wednesday, February 18, 2015 8:04 AM
To: Fitzpatrick, Ryan (CRT); Moffa, Anthony; Lareau, Alyssa (CRT); Covington, Jeryl; Farrell, Ericka
Subject: Staff call re potential RFI content
When: Wednesday, February 18, 2015 3:00 PM-4:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Conference call in number is Ex. 6 - Personal Privacy (more directions below)

I am still planning on talking today.

Let me know if anything has changed.

Am working on draft this morning & will circulate by noon.

Everyone else, please also circulate what you have been working on

Conference call in number is Ex. 6 - Personal Privacy

Conference extension is Ex. 6 - Personal Privacy

Participant code is Ex. 6 - Personal Privacy

To: O'Lone, Mary[OLone.Mary@epa.gov]; Fitzpatrick, Ryan (CRT)[Ryan.Fitzpatrick2@usdoj.gov]; Neal, Daria (CRT)[Daria.Neal@usdoj.gov]; Lareau, Alyssa (CRT)[Alyssa.Lareau@usdoj.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]; Moffa, Anthony[Moffa.Anthony@epa.gov]
From: Rhodes, Julia
Sent: Thur 1/15/2015 5:03:15 PM
Subject: RE: **Ex. 5 - Deliberative Process**

Looping Anthony into the emails

Julia Rhodes

Assistant General Counsel for the Civil Rights Practice Group

Civil Rights and Finance Law Office

Office of General Counsel

Environmental Protection Agency

1200 Pennsylvania Avenue, NW, 2399A

Washington, DC 20460

Phone: 202.564.1417

From: O'Lone, Mary
Sent: Thursday, January 15, 2015 11:51 AM
To: Fitzpatrick, Ryan (CRT); Neal, Daria (CRT); Lareau, Alyssa (CRT); Covington, Jeryl; Rhodes, Julia; Farrell, Ericka; Wooden-Aguilar, Helena
Subject: RE: **Ex. 5 - Deliberative Process**

We had an email exchange with Daria last week postponing until we can get a time when Lilian Dorka can join us & we have more to report on the letter. I think OCR will reach out to then set up the meeting.

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: Fitzpatrick, Ryan (CRT) [mailto:Ryan.Fitzpatrick2@usdoj.gov]
Sent: Thursday, January 15, 2015 11:47 AM
To: Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); O'Lone, Mary; Covington, Jeryl; Rhodes, Julia; Farrell, Ericka; Wooden-Aguilar, Helena
Subject: Ex. 5 - Deliberative Process

Hello all,

Unfortunately, it looks like today's meeting will be canceled. I will reach out to all of you next week and set up a new time for our next meeting.

Thank you,

Ryan

Ryan N. Fitzpatrick

Presidential Management Fellow Program Analyst

Federal Coordination and Compliance Section

Civil Rights Division

U.S. Department of Justice

950 Pennsylvania Avenue, NW

Washington, DC 20530

(202) 353-4084

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To: Fitzpatrick, Ryan (CRT)[Ryan.Fitzpatrick2@usdoj.gov]; Neal, Daria (CRT)[Daria.Neal@usdoj.gov]; Lareau, Alyssa (CRT)[Alyssa.Lareau@usdoj.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Rhodes, Julia[Rhodes.Julia@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]
From: O'Lone, Mary
Sent: Thur 1/15/2015 4:50:37 PM
Subject: RE: Ex. 5 - Deliberative Process

We had an email exchange with Daria last week postponing until we can get a time when Lilian Dorka can join us & we have more to report on the letter. I think OCR will reach out to then set up the meeting.

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: Fitzpatrick, Ryan (CRT) [mailto:Ryan.Fitzpatrick2@usdoj.gov]
Sent: Thursday, January 15, 2015 11:47 AM
To: Neal, Daria (CRT); Fitzpatrick, Ryan (CRT); Lareau, Alyssa (CRT); O'Lone, Mary; Covington, Jeryl; Rhodes, Julia; Farrell, Ericka; Wooden-Aguilar, Helena
Subject: Ex. 5 - Deliberative Process

Hello all,

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Thank you,

Ryan

Ryan N. Fitzpatrick

Presidential Management Fellow Program Analyst

Federal Coordination and Compliance Section

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To: Neal, Daria (CRT)[Daria.Neal@usdoj.gov]; Fitzpatrick, Ryan (CRT)[Ryan.Fitzpatrick2@usdoj.gov]; Lareau, Alyssa (CRT)[Alyssa.Lareau@usdoj.gov]; O'Lone, Mary[OLone.Mary@epa.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Rhodes, Julia[Rhodes.Julia@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]
From: Fitzpatrick, Ryan (CRT)
Sent: Thur 1/15/2015 4:47:02 PM
Subject: Ex. 5 - Deliberative Process - Ex. 5 - Deliberative Process

Hello all,

Unfortunately, it looks like today's meeting will be canceled. I will reach out to all of you next week and set up a new time for our next meeting.

Thank you,

Ryan

Ryan N. Fitzpatrick

Presidential Management Fellow Program Analyst

Federal Coordination and Compliance Section

Civil Rights Division

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U.S. Environmental Protection Agency (EPA) and U.S. Department of Justice (DOJ) Meeting
re: REACH, Inc. Complaint
Call Connection Information: Ex. 6 - Personal Privacy Passcode: Ex. 6 - Personal Privacy

November 7, 2014
2 p.m. – 3 p.m.

Conference

I. Introductions

II. Background on Civil Rights Division's Title VI Coordination Work

III. Discussion of EPA's Process (i.e., understanding the DCROs' role) and Investigation Plan

- EPA Order 4700 Deputy Civil Rights Officials
- EPA Order 4701 Title VI Case Management Protocol

IV. Ex. 5 - Deliberative Process

V. Ex. 5 - Deliberative Process

VI. Next Steps/Meeting

To: Rhodes, Julia[Rhodes.Julia@epa.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; O'Lone, Mary[o'lone.mary@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]
From: Wooden-Aguilar, Helena
Sent: Sun 11/2/2014 7:51:38 PM
Subject: Fwd: REACH, Inc. - Partial Acceptance Letter (HOLD UNTIL COS CLEARS)

FYI.

Helena Wooden-Aguilar
Assistant Director
External Civil Rights - US EPA
202-564-0792 (office)
Ex. 6 - Personal Privacy
wooden-aguilar.helena@epa.gov

Begin forwarded message:

From: "Golightly-Howell, Velveta" <Golightly-Howell.Velveta@epa.gov>
Date: November 2, 2014 at 2:11:53 PM EST
To: "Wooden-Aguilar, Helena" <Wooden-Aguilar.Helena@epa.gov>
Subject: REACH, Inc. - Partial Acceptance Letter (HOLD UNTIL COS CLEARS)

Hi Helena. Touched base w/Gwen re: letter. She has asked to connect one more time before the letter is mailed/sent. I hope to do this on Tuesday when she'll be back in the office. Please hold off until Gwen clears letter.

VelvetaV

From: Golightly-Howell, Velveta
Sent: Saturday, November 1, 2014 9:00:47 PM
To: Wooden-Aguilar, Helena
Cc: Golightly-Howell, Velveta
Subject: Fw: REACH, Inc. - Partial Acceptance Letter (Meeting with DOJ re REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964))

Hi Helena. Please ensure that I get this letter on Monday morning to sign before "11 a.m." It should be hand-delivered to me personally regardless of whether I'm in a meeting. Once signed, please make sure that Ms. Whickum signs and mails it. Thanks.

Velveta

From: Golightly-Howell, Velveta
Sent: Saturday, November 1, 2014 8:56:57 PM
To: KeyesFleming, Gwendolyn
Cc: Packard, Elise; Rhodes, Julia; Wooden-Aguilar, Helena; Shenkman, Ethan; Reeder, John
Subject: REACH, Inc. - Partial Acceptance Letter (Meeting with DOJ re REACH, Inc. (Complaint

under Title VI of the Civil Rights Act of 1964))

After sending this, I recalled that you cleared the letter's finalization during a recent meeting, Gwen. We'll finalize it on Monday and get it out the door. Bye all.

Velveta

From: Golightly-Howell, Velveta
Sent: Friday, October 31, 2014 7:52:13 PM
To: KeyesFleming, Gwendolyn; Reeder, John
Cc: Packard, Elise; Rhodes, Julia; Wooden-Aguilar, Helena; Shenkman, Ethan
Subject: FW: Meeting with DOJ re REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964)

Sharing Daria Neal's message FYI Gwen and John. OGC and OCR are arranging to meet with Daria and members of her staff on 11/7. We will share highlights. OCR and OCR are working on a Case Mgt. Plan. We look forward to getting the REACH partial acceptance letter from you, Gwen. After it's finalize and following consultation with you we'll be better positioned to respond **Ex. 5 - Deliberative Process**

Ex. 5 - Deliberative Process

Velveta

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Thursday, October 23, 2014 5:24 PM
To: Golightly-Howell, Velveta; Wooden-Aguilar, Helena; Rhodes, Julia
Cc: O'Lone.Mary@epa.gov; Lareau, Alyssa (CRT); Packard, Elise; Fitzpatrick, Ryan (CRT)
Subject: RE: REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964)

Hello Velveta, Helena, and Julia.

I hope all is well. We would like to schedule a time to talk during the week of November 3rd **Ex. 5 - Deliberative Process**

Ex. 5 - Deliberative Process Can you please let us know some dates and times you are available)?

Thanks.

Best,

Daria

Daria E. Neal

Deputy Chief

Federal Coordination and Compliance Section

Civil Rights Division

United States Department of Justice

Email: daria.neal@usdoj.gov

Tel: (202) 305-3346

Fax: (202) 307-0595

Follow the Civil Rights Division on Twitter: @CivilRights

Sign up here for our Title VI Newsletter, and read past issues here.

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]
Sent: Friday, September 26, 2014 6:36 PM
To: Neal, Daria (CRT)
Cc: Jang, Deeana (CRT); Fitzpatrick, Ryan (CRT); Wooden-Aguilar, Helena; Rhodes, Julia; O'Lone.Mary@epa.gov; Lareau, Alyssa (CRT); Packard, Elise
Subject: REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964)

Thank you Daria. Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Velveta

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Friday, September 26, 2014 6:09 PM
To: Golightly-Howell, Velveta; Lareau, Alyssa (CRT)
Cc: Jang, Deeana (CRT); Fitzpatrick, Ryan (CRT); Wooden-Aguilar, Helena; Rhodes, Julia; O'Lone.Mary@epa.gov
Subject: RE: REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964)

Hi Velveta,

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Have a good weekend.

Daria

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]
Sent: Wednesday, September 24, 2014 8:38 PM
To: Lareau, Alyssa (CRT); Neal, Daria (CRT)
Cc: Jang, Deeana (CRT); Fitzpatrick, Ryan (CRT); Wooden-Aguilar, Helena; Rhodes, Julia; O'Lone.Mary@epa.gov
Subject: REACH, Inc. (Complaint under Title VI of the Civil Rights Act of 1964)

Hi Alyssa and Daria. We appreciated your and Ryan meeting with us today. Daria, in response to my question, Ex. 5 - Deliberative Process t copy Julia and Mary? As she said, Helena will forward the info you requested ASAP. Bye everyone.

Velveta

From: Lareau, Alyssa (CRT) <Alyssa.Lareau@usdoj.gov>
Sent: Tuesday, September 23, 2014 2:51:39 PM
To: Golightly-Howell, Velveta; Neal, Daria (CRT)
Cc: Jang, Deeana (CRT); Fitzpatrick, Ryan (CRT); Wooden-Aguilar, Helena; Wooden-Aguilar, Helena
Subject: RE: Complaint under Title VI of the Civil Rights Act of 1964

All,

We are looking forward to our phone discussion at noon tomorrow. Let's use the following call in information:

Ex. 6 - Personal Privacy

Let me know if you have any questions.

Alyssa

Alyssa C. Lareau

Attorney

Federal Coordination and Compliance Section

U.S. Department of Justice - Civil Rights Division

Direct: (202) 305-2994 [voice]

alyssa.lareau@usdoj.gov

http://www.justice.gov/crt/about/cor/

From: Golightly-Howell, Velveta [mailto:Golightly-Howell.Velveta@epa.gov]

Sent: Monday, September 22, 2014 5:28 PM
To: Neal, Daria (CRT)
Cc: Jang, Deeana (CRT); Lareau, Alyssa (CRT); Fitzpatrick, Ryan (CRT); Wooden-Aguilar, Helena; Wooden-Aguilar, Helena
Subject: RE: Complaint under Title VI of the Civil Rights Act of 1964

Hi Daria. While I'd welcome the opportunity to sit down with you all, I have a meeting with a regional official that's not scheduled to end until noon on the 24th. Take care.

Velveta

Velveta Golightly-Howell

Director, Office of Civil Rights

Environmental Protection Agency

1200 Pennsylvania Avenue, N.W.

Mail Code 1201A

Washington, DC 20460

202-564-6685

From: Neal, Daria (CRT) [mailto:Daria.Neal@usdoj.gov]
Sent: Monday, September 22, 2014 5:20 PM
To: Wooden-Aguilar, Helena
Cc: Golightly-Howell, Velveta; Jang, Deeana (CRT); Lareau, Alyssa (CRT); Fitzpatrick, Ryan (CRT)
Subject: RE: Complaint under Title VI of the Civil Rights Act of 1964

Hi Helena,

That works well for us. Would you prefer to meet in person or by phone? We can come to

your office.

Daria

From: Wooden-Aguilar, Helena [mailto:Wooden-Aguilar.Helena@epa.gov]
Sent: Monday, September 22, 2014 3:08 PM
To: Neal, Daria (CRT)
Cc: Golightly-Howell, Velveta; Jang, Deeana (CRT); Lareau, Alyssa (CRT); Fitzpatrick, Ryan (CRT)
Subject: Re: Complaint under Title VI of the Civil Rights Act of 1964

Hi Daria

I am working on scheduling this meeting. How does the 24th at noon work for you and others at Justice?

Helena

Helena Wooden-Aguilar

Assistant Director

External Civil Rights - US EPA

202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

On Sep 18, 2014, at 12:49 PM, "Neal, Daria (CRT)" <Daria.Neal@usdoj.gov> wrote:

Hi Velveta and Helena,

Ex. 5 - Deliberative Process

Can you let us know some dates over the next two weeks that you are available to meet?

Also, we are missing some parts of the exhibits. If you have the following, can you please email them to us.:

- Vol I - Exs 1-26. The pdf stopped at Ex 6, sub-exhibit 11 (We have Ex. 6, the Declaration of Larry Baldwin and sub-exhibits 1-11 of that Declaration but not sub-exhibits 12-17 of that declaration). We are missing Exhibits 7-26 in their entirety.

- Ex 39 documents are very blurry. Did you all receive a clear copy?

Thank you so much.

Daria

From: Jocelyn D'Ambrosio [mailto:jdambrosio@earthjustice.org]
Sent: Wednesday, September 03, 2014 6:39 PM
To: 'mccarthy.gina@epa.gov'; 'Title_VI_Complaints@epa.gov'
Cc: 'wooden-aguilar.helena@epa.gov'; 'Tejada.matthew@epa.gov'; 'McTeertoney.heather@Epa.gov'; 'Halim-Chestnut.naima@Epa.gov'; Neal, Daria (CRT); 'tom.reeder@ncdenr.gov'; 'christine.lawson@ncdenr.gov'; naeema1951@gmail.com; 'djhall7@aol.com'; 'lbaldwin@waterkeeper.org'
Subject: Complaint under Title VI of the Civil Rights Act of 1964

Dear Administrator McCarthy and Ms. Golightly-Howell,

On March 7, 2014, the North Carolina Department of Environment and Natural

Resources ("DENR") issued a general permit that allows industrial swine facilities in North Carolina to operate with grossly inadequate and outdated systems of controlling animal waste and little provision for government oversight, which has an unjustified disproportionate impact on the basis of race and national origin against African Americans, Latinos, and Native Americans in violation of Title VI of the Civil Rights Act of 1964 and EPA's implementing regulations.

North Carolina Environmental Justice Network, Rural Empowerment Association for Community Help, and Waterkeeper Alliance, Inc. ("Complainants") hereby submit the attached complaint against DENR and request that EPA investigate the complaint and require that DENR come into compliance with the law.

As you may know, Complainants and other community members in eastern North Carolina have complained to DENR about the adverse effects of the swine industry on their health and environment for years, to no avail. Today, Complainants ask that EPA take action.

We will be forwarding exhibits by separate email and, also, sending hard copies overnight by Federal Express to each of your offices. Of course, please let us know if these materials raise any question. We would welcome the opportunity to discuss the complaint.

Sincerely,

Jocelyn D'Ambrosio and Marianne Engelman Lado

Jocelyn D'Ambrosio

Associate Attorney

Earthjustice Northeast Office

48 Wall Street, 19th Floor
New York, New York 10005
T: 212-845-7385
F: 212-918-1556
earthjustice.org

<image001.gif>

To: Marianne Engelman Lado[mengelmanlado@earthjustice.org]; Farrell, Ericka[Farrell.Ericka@epa.gov]
Cc: Haddix, Elizabeth McLaughlin (emclaugh@email.unc.edu)[emclaugh@email.unc.edu]; Ducharme, Brent[ducharme@email.unc.edu]; Alexis Andiman[aandiman@earthjustice.org]; Johnson, Johahna[Johnson.Johahna@epa.gov]
From: O'Lone, Mary
Sent: Thur 5/26/2016 5:54:22 PM
Subject: RE: Supplement to the Record, Administrative Complaint 11R-14-R4

Marianne-

I am confirming that we have received your email.

We will get back to you.

Thanks, Mary

P.S. Would you please also cc Johahna Johnson in my office on emails. I don't want anything to fall through the cracks when I am on vacation this summer. I have ccd her on this email.)

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: Marianne Engelman Lado [mailto:mengelmanlado@earthjustice.org]
Sent: Thursday, May 26, 2016 12:13 PM
To: Farrell, Ericka <Farrell.Ericka@epa.gov>; O'Lone, Mary <OLone.Mary@epa.gov>
Cc: Haddix, Elizabeth McLaughlin (emclaugh@email.unc.edu) <emclaugh@email.unc.edu>; Ducharme, Brent <ducharme@email.unc.edu>; Alexis Andiman <aandiman@earthjustice.org>
Subject: Supplement to the Record, Administrative Complaint 11R-14-R4

Dear Mary and Ericka,

This email and attachments are intended both to supplement the record in Administrative Complaint 11R-14-R4 filed on behalf of North Carolina Environmental Justice Network (NCEJN), Rural Empowerment Association for Community Help (REACH) and Waterkeeper Alliance against the North Carolina Department of Environment and Natural Resources, now the Department of Environmental Quality (DEQ) and, also, to follow up on the interview conducted by the Office of Civil Rights (OCR) on May 11, 2016 with Dr. Jill Johnston. In addition, I'm pleased to let you know that **Ex. 6 - Personal Privacy** and has indicated that he would be willing to schedule an interview with OCR. In order to avoid any confusion about materials previously submitted by complainants related to Dr. Wing's work and expertise, we are attaching Dr. Wing's c.v., the original and updated disparities analyses that he co-authored with Dr. Johnston, Dr. Wing's declaration, and Exhibits 2, 50, 52 and 53 to the complaint, each of which were authored or co-authored by Dr. Wing.

With the goal of moving forward in a timely way, I have touched base with Dr. Wing on his availability and am hoping that one of the following times might be convenient for you:

Wednesday, June 15, any time between 9 and noon

Thursday, June 16, from 3-5

In follow up to Dr. Johnston's interview and to supplement the record, attached please find the final published version of Guidry, et al., "Hydrogen Sulfide Concentrations at Three Middle Schools Near Industrial Livestock Facilities," published in the Journal of Exposure Science and Environmental Epidemiology (2016), as well as a paper discussed by Dr. Johnston during the interview, Johnston, et al., "Wastewater Disposal Wells, Fracking, and Environmental Injustice in Southern Texas, published in the American Journal of Public Health (2016) (analyzing racial composition of residents living less than 5 kilometers from disposal wells using a similar approach to the disparities analysis conducted by Drs. Wing and Johnston and submitted by complainants in this case).

We will send additional material in follow up to the interview by separate cover. In addition, we understand that you had hoped to send Dr. Johnston a list of paragraphs in the complaint that she

might review to determine whether the characterizations in the complaint are consistent with the findings of the disparities analyses. We await this follow up as well.

Please let me know if this email raises any question. I look forward to hearing back from you regarding a date and time for an interview with Dr. Wing. We can then also discuss the timing for any additional follow up interview with Dr. Johnston.

Thanks again,

Marianne

Marianne Engelman Lado

Senior Staff Attorney

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New York, NY 10005

T: 212.845.7393

F: 212.918.1556

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